Bonneagar Iompair Éireann

Transport Infrastructure Ireland

PROJECT:

M6(M17/M18) Motorway Service Areas

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Contents

1 Introduction

1.1 *Overview*

The M6(M17/M18) Motorway Service Area (MSA) entails the development of a service area between M6 Junction 17 (Athenry) and M6 Junction 19 (Oranmore). The purpose of a service area is to provide rest and refuelling facilities for users of the M6 and M17/M18. The MSA will include an amenity building (including a convenience shop, restaurant, washrooms and tourist information), fuel facilities, parking and picnic area.

Halcrow Barry Ltd. was appointed by Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)) in July 2015 to undertake all services necessary to purposefully deliver the site selection, preliminary design, planning and Environmental Impact Assessment (EIA) in accordance with NRA Project Management Guidelines[1] (PMG) Phases 2, 3 and 4 in the development of the M6(M17/M18) MSA.

This report outlines the findings of the Site Selection Study and identifies the preferred site for the M6(M17/M18) MSA.

On approval of the preferred site, a preliminary design and Environmental Impact Statement (EIS) for the scheme will be undertaken, which will be submitted to An Bord Pleanála (ABP) for planning approval.

The M6(M17/M18) MSA is being developed in line with TII's National Policy as outlined in the Service Area Policy (NRA, August 2014).

[1] This report contains numerous references to documents published by TII/NRA. The documents are referenced according to the title of the document at the time of publication. Therefore the documents published prior to August 2015 include 'NRA' in the title rather than 'TII'.

2 Background to the Project

2.1 TII Policy

The construction of the motorway network in the period since 2000 to present has dramatically changed the driving experience in Ireland. An integral part of a safe motorway network is the provision of suitable services and facilities for road users to avail of at reasonable intervals.

In fact, this need has recently been given legal standing by European Union regulations under the Trans-European Transport Networks (TEN-T) policy. This legal requirement is further emphasised in the following EU Regulations and Directives:

Policy	Regulation/Directive
Trans-European Transport Networks	Regulation (EU) No 1315/2013
Driving Time and Rest Periods	Regulation (EU) No 561/2006
Road Infrastructure Safety Management	Directive 2008/96/EC
Intelligent Transport Systems	Directive 2010/40/EU

In Ireland, the Service Area Policy (NRA, 2014) sets out the national policy with regard to the provision of MSAs on the national road network.

The policy targets the provision of Service Areas at regular intervals on the dual carriageway/motorway network. The proposals for the location of MSAs on the national road network can be seen in Figure 2.1.

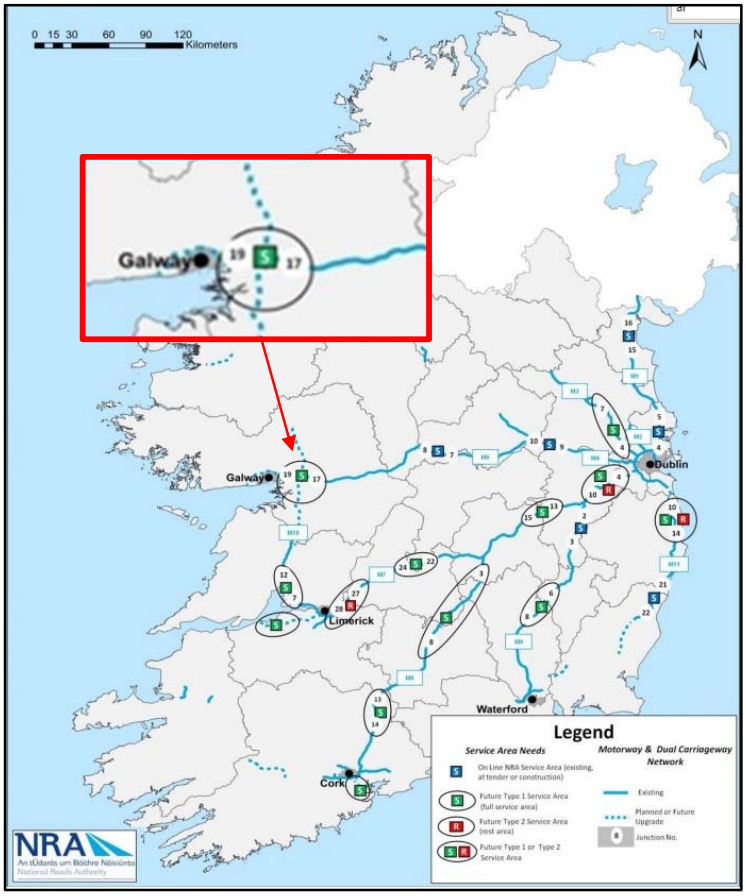


Figure 2.1: Service Area Policy – Service Area Needs

As shown in Figure 2.1, the policy identifies the need for a service area to be located between M6 Junction 17 (Athenry) and M6 Junction 19 (Oranmore) servicing both the M6 and M17/M18 traffic. This length of motorway is therefore considered as the Study Area for the M6(M17/M18) MSA.

The Study Area is shown in detail on Drawing Y15112-M6-SSR-001 in Appendix A.

It is recognised that while Section 3.4 (Table 3.9) of the policy references a service area at the junction of the M6/M17/M18 at Rathmorrissy (Junction 18), the intention of the policy is that the service area be at an appropriate location and be accessible to both the M6 traffic and M17/M18 traffic.

The M17 and M18 motorways to the north and south of the Rathmorrissy Interchange were initially considered as being part of the study area. However following a review of the traffic volumes for the four arms of the interchange, it was recognised that both the M17 and M18 have significantly lower levels of traffic relative to the M6 both east and

west of the Rathmorrissy Interchange. It was therefore concluded that the site selection study should focus on potential sites along the M6 between Junction 17 and Junction 19 only.

An MSA within the identified Study Area will serve road users on both the M6 and the M17/M18, which intersect the M6 motorway at Junction 18.

2.2 Project description/ Facilities to be provided

The TII policy identifies the possibility of developing two different types of MSA depending on the characteristics of the motorway network at any given location. The types of service areas are as follows:

Type 1 (Full Service Areas) – including an amenity building together with fuel facilities, parking, toilet and picnic facilities.

Type 2 (Rest Areas) – including parking, picnic and toilet facilities.

A Type 1 MSA is specified within the policy at this location to serve traffic travelling in both directions of the motorways.

As set out in the TII policy the key needs of road users to be addressed by a Type 1 MSA include:

- Areas for commercial vehicles to park allowing drivers to take their mandatory break and rest periods (including overnight parking);
- Areas for all road users to park and rest in order to reduce fatigue; and
- Access to facilities for road users including:
    - fuel stations;
    - toilets;
    - showers;
    - convenience shops;
    - restaurant/food outlets tourist information; and
    - play areas for children.

Once in place, service areas will need to continuously develop in order to meet the evolving needs of road users. Future needs are likely to include parking areas with enhanced security and the ability for advance booking of safe and secure parking for commercial vehicles.

The proposed M6(M17/M18) MSA will incorporate all of the above mentioned elements and will be designed in accordance with NRA TA 70 "The Location and Layout of On-line Service Area" (NRA, 2014).

In addition to the above, a motorway junction will be constructed as part of the development, which will provide access from the motorway to the MSA. The junction type is subject to further design and specific constraints at particular locations but the most likely junction type is a standard dumbbell arrangement. The junction type at the Rathmorrissy interchange would differ from the standard dumbbell arrangement with access being provided via a fifth arm off the roundabout. (Refer to 3.3.5 Key Assumptions).

Other notable elements of the MSA will include a waste water treatment plant, controlled local road access, landscaping and Garda enforcement area.

2.3 Implementation of TII policy

The M6(M17/M18) MSA is being developed as part of the TIIs Tranche 4 MSAs. Tranche 4 includes 3 no. MSAs at the following locations:

- M3 (between Junctions 4 and 7) – Clonee to Blundelstown;
- M18 (between Junctions 7 and 12) – Sixmilebridge to Ennis; and
- M6 (between Junctions 17 and 19) – Athenry to Oranmore.

Other MSAs have been developed in a number of Tranches as follows:

- Tranche 1 MSAs are located on the M1 at Lusk and Castlebellingham and on the M4 at Enfield. These service areas are in operation since 2010;
- Tranche 2 MSAs are located on the M9 at Kilcullen, M11 at Gorey and M6 at Athlone. These service areas are currently at construction stage and will commence operation in 2016; and
- Tranche 3 MSAs incorporates MSAs on the N28 and N69. These MSAs are currently in the planning stage.

2.4 M6(M17/M18) MSA Indicative programme

The current projected timeline (subject to funding and relevant approvals) for the development of the M6(M17/M18) MSA is as follows:

- August 2015 to November 2016 – Site selection, Preliminary design, EIA and Compulsory Purchase Order (CPO)

- December 2016 to March 2017 - ABP Oral Hearing and ABP Consideration of Planning Application
- 2017 – Public Procurement for Construct and Operate Contract
- 2017/2018 – Construction
- 2019 – Operation

3 Methodology

3.1 Introduction

The objective of the Site Selection Study is to determine the optimum site for a service area within the defined study area.

To determine the preferred site a particular methodology that follows a systematic and consistent approach has been adopted.

This methodology generally follows the principles and guidelines developed by the TII for road schemes as set out in the NRA PMG. However, where required Halcrow Barry, utilising the experience of previous TII MSAs projects, has adapted the approach to meet the needs of a particular MSA scheme.

3.2 Reference documents

As mentioned the methodology generally follows the principles and guidelines set out in the NRA PMG. Other documents and guidelines that have been referenced in the site selection study are as follows:

- NRA Service Area Policy;
- NRA DMRB;
- NRA TA 70;
- NRA Project Appraisal Guidelines (PAG);
- NRA Environmental Impact Assessment of National Road Schemes – A Practical Guide;
- Environmental Protection Agency (EPA) Environmental Impact Assessment Guidance;
- Galway County Council Development Plan 2015 – 2021;
- Office of Public Works (OPW) Preliminary Flood Risk Assessment;
- OPW Western CFRAM Study;
- Geological Survey of Ireland (GSI) Datasets;
- Department of Arts, Heritage and the Gaeltacht (DAHG) Records of Monuments & Places; and
- DAHG National Inventory of Archaeological Heritage.

3.3 Key assumptions

3.3.1 Turn in rate

The turn in rate is defined as the percentage of vehicles using the motorway that will turn in to the MSA to avail of the facilities.

The turn in rates adopted for the M6(M17/M18) MSA are outlined in the following paragraphs.

These rates have been adopted following a review of recorded turn in rates for the Tranche 1 MSAs, and having consideration for the characteristics of the motorway network in the region. In determining a turn in rate 'TRL Report 441, Turning flows at Motorway Service Areas' was also considered.

For the M6(M17/M18) MSA three scenarios were considered for the turn in rate.

The scenarios related to the different locations within the study area are as follows:

- Scenario A – applies to sites at Location 1
- Scenario B – applies to sites at Location 2
- Scenario C – applies to sites at Location 3

Refer to Drawing Y15112-M6-SSR-002 in Appendix A for the locations and refer to Section 4.2 for further detail.

Scenarios A and B apply to potential site locations accessed directly from the M6 west of Rathmorrissy only and assume a good directional signage strategy to encourage usage from M17, M18 and M6 east of Rathmorrissy.

Scenario A assumes a turn in rate of 8.1%. This turn in rate is comprised of a 10% turn in rate from the M6, a 2% turn in from the M17/M18 for HGVs and a 1% turn in rate from the M17/M18 for LGVs.

Scenario B assumes a turn in rate of 8.3%. This turn in rate is comprised of a 10% turn in rate from the M6, a 3% turn in from the M17/M18 for HGVs and a 2% turn in rate from the M17/M18 for LGVs. A slightly higher turn in rate from the M17/M18 is assumed for scenario B when compared to scenario A, as location 2 is closer to the Rathmorrissy interchange than location 1.

Scenario C assumes a turn in rate of 9.0% from all traffic passing through the Rathmorrissy junction from the M6, M17 and M18.

Refer to Appendix B for further details on the turn in rate calculations.

3.3.2 *Base Year, Opening Year, Design Year*

The base year, opening year and design year are as follows:

- Base Year: 2014
- Opening Year: 2018
- Design Year: 2043

3.3.3 *Traffic volumes & growth*

The traffic volumes have been obtained from the National Transport Model (NTpM) for both the M6 and the M17/M18. This model estimated the 2030 flows on both the M6 and the M17/M18 following the completion of the M17/M18 Motorway. Growth rates obtained from the NRA PAG Unit 5.5 were utilised to calculate the 2018 and 2043 traffic volumes.

The annual average daily traffic (AADT) figures for both the M6 and M17/M18 at the Rathmorrissy Interchange have been combined, as it has been assumed that the proposed Motorway Service Area will cater for vehicles on both the M6 and M17/M18. The traffic and turn in volumes for the scheme are shown in Table 3.1.

M6/M17/M18 traffic volumes at Rathmorrissy Interchange (Medium Growth)				
Year		*2014*	*2018 (Opening year)*	*2043*
AADT		35,834	37,110	46,443
%HGV		5.47	5.39	4.59
HGV		1960	2002	2133
Cars & LGV's		33,874	35,108	44,309
% turn in rate	Location 1	-	8.1%	8.1%
	Location 2	-	8.3%	8.3%
	Location 3	-	9.0%	9.0%
Vehicles using MSA	Location 1	-	3,006	3,761
	Location 2	-	3,084	3.860
	Location 3	-	3,340	4,180

Table 3.1: Traffic volumes and growth for combined M6 and M17/M18 Rathmorrissy Interchange. Figures taken from TII NTpM.

3.3.4 *Online facility*

The M6(M17/M18) MSA is to be developed on the basis that it is an online MSA i.e. the MSA is directly accessible from the motorway and is not located at an existing junction. An MSA located at an interchange between two motorways, such as the Rathmorrissy Interchange, is considered to be an online facility as there is no access from other routes.

The provision of an online MSA is consistent with TII policy, which identifies a preference for such facilities, having regard for public convenience, control over the quality, extent and nature of services to be provided, and the ability of the Authority to respond to emerging law, such as the ITS Directive and the TEN-T Regulations.

3.3.5 *Single Sided Facility*

The M6(M17/M18) MSA is being developed on the basis that it is a single sided facility. A single sided facility is required where traffic volumes are less than 40,000 vehicles per day (NRA TA 70 paragraph 3.4) in the year of opening of the facility. This assumption is made following analysis of traffic flows and has been discussed and agreed with the TII, as outlined in TA 70.

A single sided MSA is a facility that is located on one side of the motorway but can be accessed from both carriageways (both directions of travel) by means of a grade separated junction.

3.3.6 *Required Site Area*

For the purpose of this assessment a site area of approximately 15 hectares (ha) was taken at each of the site locations. It can be assumed that the site boundaries would follow existing field boundaries or physical constraints as far as is practical.

The figure of 15ha is adopted following a review of the TII MSAs developed to date. This area should be more than adequate to accommodate all the proposed features including landscaping and other environmental mitigation features. It is a conservatively high estimate and it is recognised that the area required will change or be refined in subsequent stages as the design develops. However to assess sites on an equal basis, all were considered to be 15ha in size.

A rectangular shape of 300m X 500m has generally been adopted but these dimensions are flexible and can be adjusted to account for local constraints where required.

3.3.7 *Other Site Requirements*

Water supply – it is assumed that water supply will be provided from public mains supply. It may be possible that an onsite well will supply water needs of the MSA, which will be investigated at subsequent stages.

Wastewater discharge – it is assumed that the wastewater will be treated onsite followed by pumping via a rising main to the local sewer network. An initial review of the study area and consultation with the local authority and Irish Water considered this option as the most likely solution. Alternative treatment and discharge options i.e. discharge to ground or local stream, will be considered further during the preliminary design stage. Details of the treatment and discharge will be subject to agreement with Irish Water and Galway County Council. Consultation with the aforementioned bodies is ongoing.

Local access road – a local controlled access road is required to facilitate staff and emergency access.

3.4 Description of Methodology

3.4.1 *Preamble*

The methodology developed followed a step by step approach:

i. Identify constraints
ii. Geometric appraisal
iii. Identification of potential sites
iv. Evaluation of potential sites under various Engineering, Environmental and Economic considerations
v. Determination of preferred site

3.4.2 *Description of steps to determine preferred site*

i. Identify Constraints

The significant constraints within the study area were identified. Physical features such as the road network, rivers/streams, service and utility infrastructure, as well as the significant environmental features were all recorded and mapped.

Information on existing features and constraints were sourced from national databases, as-built motorway construction information and various third parties, before being confirmed by site visits.

ii. Geometric Appraisal

The geometric appraisal encompassed a broad analysis of the geometry of the motorway through the study area. This included a review of the existing horizontal and vertical curvature parameters to determine if the service area diverge and merge lanes could be incorporated into the existing motorway alignment in such a way that they would not adversely affect the safety of existing road users. It also included an assessment of weaving lengths between the existing junctions, such that vehicles would not be forced to perform potentially unsafe manoeuvres in entering/exiting the service area.

A primary constraint in identifying possible suitable locations is the necessity to avoid conflict between traffic using the service area slip roads and traffic using the slip roads of the nearest adjacent junction. NRA Standard TD 22 "Layout of Grade Separated Junctions" (NRA, 2009) identifies that ideally a minimum distance of 2km should be provided from one junction to the next to allow for sufficient lengths for streams of vehicles to safely merge and diverge between the junctions. Where a new junction is being constructed and the minimum distance of 2km is not achievable this may be reduced to 1km as a relaxation from standard where the traffic figures are sufficiently low in the design year. A Departure from Standard may be applied for through the TII departures process where the traffic figures are higher.

The geometric appraisal ultimately identified lengths of motorway where an MSA junction could be accommodated. Refer to Section 4.2 and Drawing Y15112-M6-SSR-002 for further detail.

iii. Identification of Sites

From the geometric appraisal outlined above, a number of locations where a junction could be located on the existing motorway were identified. The next step was the identification of sites, which involved a review of these locations and surrounding area in order to determine if and where a site for a MSA could be accommodated.

The identification of sites involved the identification of an area of approximately 15ha that could accommodate a MSA, having consideration for the local constraints and features.

Local constraints that influenced the location of potential sites were rivers, streams, dwellings, topography, existing field boundaries, HV voltage electricity pylons, etc.

iv. Evaluation of Potential Sites under various Engineering, Environmental and Economic Considerations - Multi Criteria Analysis

The potential sites were assessed against each other under three main headings; 1.) Engineering, 2.) Environmental, and 3.) Economic. The various sub-elements of these assessment criteria are listed in Table 3.2 and are discussed further in Section 3.5 herein.

Engineering	**Environmental**	**Economic**
1.) Traffic Volumes	1.) Air Quality	1.) Benefit cost ratio
2.) Road Safety	2.) Noise	
3.) Physical Characteristics of the Site	3.) Landscape & Visual	
4.) Service & Utility connections	4.) Agriculture	
5.) Geotechnical	5.) Non- Agricultural Properties / Material Assets	
6) Distance to adjacent online service area or locally available services	6.) Ecology	
	7.) Archaeology	
	8.) Cultural & Architectural Heritage	
	9.) Human Beings/ Socio Economic	
	10.) Planning	
	11.) Geology & Hydrogeology	
	12.) Hydrology	
	13.) Waste	

Table 3.2. Site Selection Assessment Criteria

The criteria above have been identified utilising the TII and HB's extensive experience in the site selection of MSAs and similar projects.

A qualitative ranking system, similar in nature to that outlined in the NRA's "Environmental Impact Assessment of National Road Schemes –A Practical Guide" (NRA, 2008), has been developed to compare specific site characteristics, as shown in Table 3.3.

Extreme Positive	Severe Negative
Major Positive	Major Negative
Moderate Positive	Moderate Negative
Minor Positive	Minor Negative
Neutral	

Table 3.3: Qualitative Ranking System

The above site specific ranking system was then used to determine, compare and contrast the relative advantages and disadvantages of each location in relation to the other, as opposed to a set of universal or general criteria. Where no relative advantage or disadvantage has been identified between the site locations for a particular criterion, each of the assessed sites has been given a neutral rating. For the environment assessment, where all sites may have an overall negative impact for a particular criteria but one site has been assessed as having an advantage over other sites, this site will be assigned a baseline neutral ranking with subsequent sites ranking either minor negative, moderate negative or major negative from this baseline.

For each of the criteria, a qualitative approach was adopted to assign the relative rankings of each site. Therefore, judgement was applied in arriving at the rankings assigned. A description of each criteria is provided in Section 3.5.

v. Determination of Preferred Site

The above ranking system was then used to determine which of the potential sites best met the criteria. The assessment was carried out by comparing the merits of each site against each other as opposed to being compared against a set of general/national criteria/values. The sites that rated best in comparison to each other are therefore given the best ranking, i.e. positive, the sites that compare worst against each other are given the lowest, i.e. negative ranking. A fair and unbiased qualitative assessment of each site's merits has been undertaken based on all the information available.

For drawing a conclusion as to which site represents the best option considering all of the criteria put together, judgement was applied and a qualitative assessment undertaken to arrive at the preferred option. Since no single site ranked highest or equal highest in each and every criteria, it follows that the chosen preferred site had to be a compromise of all the competing factors.

3.5 Description of Assessment Criteria

3.5.1 Engineering

1) Traffic - The traffic volumes and likely turn in rates of the section of motorway in which each of the potential sites are located was considered. It is deemed preferable to locate a service area on a section of motorway that has the highest traffic volumes

turning into the MSA as in this way the service area will serve the highest possible number of road users.

2) Road Safety - A Road Safety Impact Assessment (RSIA) as per NRA TD 18 has been undertaken for the M6(M17/M18) MSA. The RSIA considered the safety implications of the development of an MSA at each of the potential site locations. The RSIA also identified a site preference or ranking in terms of road safety of the potential sites that are being considered.

3) Physical Characteristics of Site - This criteria considers a number of the physical features and constraints at or in the vicinity of the site that will be a factor in the development of a MSA. The factors considered include:

    - Land Availability & Setting
    - Terrain
    - Conflicts with existing utilities and services
    - Surface water features
    - Motorway structures and other motorway features
    - Flooding

4) Service and utility connections - This criteria considers the potential for the MSA to be served by surrounding infrastructure. Key requirements of an MSA are water supply, wastewater discharge, connection to the local road network, telecommunications, electrical supply and an outfall for surface water runoff.

5) Geotechnical - The existing ground/geotechnical conditions can be a significant engineering challenge in the development of a service area.

6) Distance to adjacent online service area or locally available services - The location of adjacent online service areas has been considered in the site selection process. On consideration it is recognised that the location of adjacent online service area or locally available services is not a major differentiator between potential sites within the same study area. The potential sites being considered are on the same stretch of motorway and therefore the relative location of the nearest MSA is similar to within a few kilometers. This criteria is therefore not considered further and is excluded from the assessment tables provided.

    It is noted that there is no online MSA along the existing M6 Motorway close to the study area. The nearest online motorway service area is on the M6 at Athlone (currently under construction), while an offline filling/service station is being

constructed at Kiltullagh (Junction 16). There are other smaller filling stations located in both Oranmore and Athenry.

The above mentioned filling/service stations are not considered comparable to a Type 1 TII MSA in terms of facilities and services provided.

3.5.2 Environmental

1) Air - Assessment of air quality for each of the M6(M17/M18) MSA site options was conducted through a calculation of the index of overall change in exposure of the nearby population to NOx and PM10. The index is calculated based on the number of sensitive receptor locations within 50m of road links (new or existing) that would experience a significant change in traffic as a result of the M6(M17/M18) MSA scheme. A significant change in traffic is defined as an increase or decrease in traffic of 10% or more, and 50m represents the distance within which detectable impacts of road traffic might be found.

2) Noise - Reference has been made to guidance documents for the assessment of noise for new national road schemes, namely the "Guidelines for the Treatment of Noise and Vibration in National Road Schemes" (NRA, 2004) and "Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes" (NRA, 2014). The methodology outlined in both documents has been broadly used to compare and rank the sites under consideration.

   In order to compare the potential sites and to determine any preferences in terms of noise, the assessment of potential impact is based primarily upon property counts in the vicinity of each site, likely changes in noise environment, and a review of the mitigation measures.

3) Landscape & Visual impact - The methodology for the landscape and visual assessment has been prepared with regard to the NRA guidelines "A Guide to Landscape Treatments for National Road Schemes in Ireland" (NRA, 2006) and the EPA guidance documents on the preparation of an EIS (EPA, 2002 & 2003). Landscape has two separate but closely related aspects both assessed as part of the site selection process. The first is visual, i.e. the extent to which a new structure in the landscape can be seen. The second is landscape character impact, i.e. effects on the fabric or structure of the landscape. The methodology for the preparation of Landscape and Visual Impact assessment included a desktop review of the study area to identify landscape planning designations and a roadside survey to identify key receptors.

4) Agriculture - The methodology for the preparation of the agriculture report was based on a desktop review of the study area, local knowledge of agriculture along the M6 scheme and a roadside survey to identify agricultural and property constraints and current land use and farming activity.

   The evaluation of the site options comprised a qualitative and quantitative assessment of agricultural property at each of the proposed site options. The qualitative assessment includes a description of land use, land quality, farm activity and soils information. The quantitative assessment of the lands within the site option boundary includes the following:

   - Landtake (ha)
   - Land use (% area)
   - Grassland / Tillage lands under land quality (% area)
   - Farm houses within site option boundary (No.)
   - Farm buildings, farm yards (No.)
   - Key agricultural enterprises – Type(s) (No.)

5) Non Agricultural Properties / Material Assets - This section assesses the impact of the proposed development on non-agricultural properties and material assets. The assessment is based on a desk study, and on information gathered during the roadside survey to identify agricultural and property constraints. The desk study included an inspection of the land registry records, wind shield surveys, consultation with service providers, examination of aerial photographs and inspection of planning records to assess the degree of impact on non-agricultural properties or other material assets.

6) Ecology - The assessment is based on a desk study utilising a variety of existing data sources including recent aerial imagery, National Parks and Wildlife Service on-line mapping services showing the designated area boundaries, and other online data sources including the National Biodiversity Data Centre, Bat Conservation Ireland, Botanical Society of Britain and Ireland, and BirdWatch Ireland websites. The assessment and evaluation of the various site options is based on the impact assessment criteria defined within the "Guidelines for Assessment of Ecological Impacts on National Road Schemes" (NRA, 2008).

7) Archaeology - The site selection constraints study has been undertaken in accordance with "Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes". In accordance with the "Environmental Impact Assessment of National Road Schemes – A Practical Guide" (NRA, 2008) an impact rating for each

of the options on features of archaeological significance has been given; they are categorised as being either a positive or negative, direct or indirect impact, or as having no predicted impact. A significance impact or rating level for impacts is given i.e. slight, moderate, significant and profound in accordance with the criteria provided in the published EPA guidance documents on the preparation of an EIS (EPA, 2002 & 2003) and NRA Environmental Impact Assessment guidelines.

8) Architectural & Cultural Heritage - The site selection study has been undertaken in accordance with the NRA "Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes" (NRA, 2005). In accordance with the "Environmental Impact Assessment of National Road Schemes – A Practical Guide" (NRA, 2008) an impact rating for each of the options on features of architectural and cultural heritage significance has been given; they are categorised as being either a positive or negative, direct or indirect impact, or as having no predicted impact. A significance impact or rating level for impacts is given i.e. slight, moderate, significant and profound in accordance with the criteria provided in the published EPA guidance documents on the preparation of an EIS (EPA, 2002 & 2003) and NRA Environmental Impact Assessment guidelines.

9) Human Beings/Socio Economic - The methodology for the assessment of the potential impact on Human Beings / Socio Economic was based on a desktop review of the study area, planning history records and full review of development plans and, where they exist, local area plans. The assessment addresses impacts at a strategic level rather than for individuals or identifiable properties that have been considered for Site Selection purposes within criteria concerned with Agriculture, Agronomy and Property. Socio Economic Impact on Human Beings is considered from the perspective of severance of identifiable settlements and business units.

   The site selection criteria as a whole reflect each of the disciplines engaged to undertake the environmental assessment and design of the eventual preferred MSA site. Those disciplines in turn reflect the grouped format structure of an EIA. Any environmental effect ultimately affects the quality of life of human beings either directly in the form of human health matters e.g. road safety, air and water quality or indirectly e.g. loss of habitat and therefore reduction in biodiversity or loss/disturbance of archaeological remains and therefore a negative impact on the heritage value of the environment and collective memory. As such Human Beings as a site selection metric/criteria pervades all other site selection criteria and is considered inherent in the site selection process for that reason. Human Health Impacts are considered under separate criteria i.e. Road Safety, Noise, Air Quality assessments.

10) Planning - The methodology for the assessment of the potential impacts on Planning was based on a desktop review of the study area to identify constraints like Land Use Zoning, live planning applications / permissions and identify anomalous land uses and rank accordingly.

11) Geology & Hydrogeology - The site selection assessment for Geology and Hydrogeology has been undertaken in accordance with the EPA guidance documents on the preparation of an EIS (EPA, 2002 & 2003). The application of these guidelines to Geology and Hydrogeology is outlined in "Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes" (NRA, 2009).

12) Hydrology - The site selection assessment for hydrology has been undertaken in accordance with the EPA guidance documents on the preparation of an EIS (EPA, 2002 & 2003) and the NRA document *"*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*"* (NRA, 2009).

13) Waste - The assessment has been prepared for the provision of waste management for each of the proposed MSA sites in accordance with the NRA "Guidelines for the Management of Waste from National Road Construction Projects" (NRA, 2008). Operational waste, in the form of refuse from restaurant, shop and filling station activities, is considered to be neutral across all sites.

3.5.3 *Economic*

1) Benefit Cost Ratio - The Benefit Cost Ratio (BCR) is given by the ratio of the discounted sum of all future benefits to the discounted sum of all costs. It is one of a number of indicators that describe the efficiency of an investment and provides a means to compare alternative investments. Thus:

$$BCR = PVB/PVC$$

The Present Value of Benefits (PVB) represents the value in the present value year of all the benefits that will accrue over the appraisal period. It is calculated according to the following formula:

$$PVB = \sum_{y=year\ 0}^{y=year\ n} \frac{B_y}{(1+r)^{y-p}}$$

Where B_y is the benefit occurring in each year, from the first year in which benefits are accrued (*Year 0*) discounted as appropriate, up to the limit of the appraisal period (*year n*).

The Benefit (B) in any given year is calculated as follows:

$$B = (CSi * DU) + ((1-P) * NR) + (Akm * a * f * c) + R$$

Where:

- CSi is the average consumer surplus associated with each user of the MSA
- DU is the number of daily users of the MSA
- (1-P) is equal to 1 minus the overall profitability rate in the retail sector as a % of NR (for example if the profitability in the retail sector is 35%, 1-P = .65)
- NR is the net revenue after cost of sales
- Akm – represents the distance between Service Areas
- a – represents the accident rate associated with road usage
- f – represents the proportion of accidents attributable to fatigue
- c – represents the established monetary values associated with casualties
- R – represents the residual value associated with the project

The Present Value of the stream of Costs (PVC) represents the value in the present value year of all the costs that will accrue over the appraisal period, comprising mainly construction and maintenance costs. It is calculated in a similar way to the approach for calculation of PVB. For some schemes, it is possible that construction costs may have been incurred prior to the present value year. In such cases, this would require an inflation of the scheme costs to the present value year using the discount rate.

The approach to calculating PVC is therefore:

$$PVC = \sum_{y=year\ 0}^{y=year\ n} \frac{C_y}{(1+r)^{y-p}}$$

where C_y is the cost incurred in year y, discounted as appropriate, up to the limit of the appraisal period *year n*. *Year 0* is the first year that costs are incurred, which may be prior to the present value year.

The Costs (C) in any given year is calculated as follows:

$$C=OPC + K$$

Where:

- OPC are the operating and maintenance costs
- K represents the capital construction costs

The Benefits (B) and Costs (C) outlined above are defined in the NRA's "PAG Unit 11 – Development of Business Case for Service Areas".

At the site selection stage key differentiators between the potential sites which affect the BCR calculation are primarily the number of daily users of MSA (DU) and the construction cost (K).

3.6 Consultation

The site selection study incorporated consultation with the public, landowners and various third parties.

3.6.1 Statutory Consultation

Statutory consultees were issued with information letters inviting comment relating to the proposals.

Other stakeholders, including Galway County Council's National Road Office, Planning and Water Services sections, Irish Water, ESB and Department of Defence, were consulted to establish requirements of others.

3.6.2 Briefing of Local Area Municipal District Councillors

Public consultation in the form of a briefing with local councillors in the Athenry Oranmore Municipal District was held on the 10th November 2015. At the meeting Halcrow Barry provided a presentation on the project to local councillors, which comprised the following items:

- TII Service Area Policy;
- Site Selection Methodology;
- Assessment Criteria and Scoring System;
- The M6(M17/M18) MSA Study Area;
- The Geometric Appraisal; and

- Key Issues relating to the potential sites.

3.6.3 *Meetings with Potential Affected Landowners*

Landowner Consultation meetings were held on Wednesday 18th November 2015 in the Oranmore Lodge Hotel between 10am and 3pm. The meetings were used to:

- Inform the landowners of the proposals;
- Confirm details of what was currently farmed on their holding (e.g. Dairy, Beef, Sheep, Equine or Crops etc.);
- Discover any particular local issues with the land of significance (e.g. flooding, local springs, disposal of motorway construction material to raise field levels etc.) that would not be known by the Design Team; and
- Present to the landowner how a proposed site, were it to be chosen, would impact upon their holding.

Halcrow Barry met with 17 landowners during this session and with three other landowners on Wednesday 9th December, who were unable to attend on the 18th November.

3.6.4 *Public Information Evening*

A public information evening was held on Wednesday 18th November 2015 in the Oranmore Lodge Hotel.

Prior to the event an advertisement was placed on Galway County Council's website on the 13th November 2015. The event was also advertised on Galway County Council's Facebook and Twitter accounts. Adverts were placed in two local news publications, the Galway Bay Advertiser and the Connacht Tribune, both published on Thursday 12th November. The website notice was also placed in prominent locations in the study area in advance of the event. The locations included:

- Texaco service Station & Centra; Main Street, Oranmore;
- Tesco, Oranmore;
- Derrydonnell Service Station;
- Athenry Golf Club;
- Athenry Library/Municipal District office;
- Athenry Post Office; and
- Top Petrol Station, Swan Gate, Athenry.

Radio Readouts were also issued to a local radio station, Galway Bay FM for broadcast.

The public information meeting allowed members of the public to comment on the drawings and meet with TII, Westmeath National Road Office and Halcrow Barry. Approximately 50 members of the public attended the meeting.

Drawings and Brochures provided at the Public Consultation were subsequently made available on Galway County Council's website for members of the public that were unable to attend.

3.6.5 *Submissions Received*

A total of 19 submissions were received on or before the 4th December 2015 (or shortly afterwards). In summary, of the 19 submissions received 24% were opposed to Location 1, 29% were opposed to Location 2 and 47% were opposed to Location 3. Further details are as follows:

- One was in favour of a MSA at Location 1 in lieu of Location 3;
- One was in favour of a MSA at Site 3A;
- One submission was in favour of Location 3 in lieu of Locations 1 & 2;
- Four submissions were against Location 1;
- Four submissions were against Location 2;
- Seven submissions were against Location 3; and
- One submission had no observation to make pending the provision of more detailed information.

The main issues raised in the submissions received related to the cumulative impacts of the MSA on local residents following the construction of the M6 and the M17/M18 motorways and now the proposed M6(M17/M8) MSA.

Issues raised by Landowners, Councillors and the General Public during the Public Consultation phase have been considered and incorporated in the overall assessment of the individual site and subsequent ranking of sites when compared to one another.

3.7 Site visits

A number of site visits were undertaken by the project team through the course of the Site Selection Study.

During the initial engineering and environmental assessment site visits were undertaken in August 2015, September 2015 and December 2015. These site visits did not include entering private land. Sufficient visibility of the sites under consideration was available from public roads and overbridges to support the assessment.

4 Evaluation of Study Area

4.1 Features and Constraints

The study area runs from Junction 17 (Athenry) to Junction 19 (Oranmore) on the M6, a distance of approximately 12km. The towns of Athenry and Oranmore are located at either extent of the study area. Galway City lies to the west of Oranmore.

A new junction at Rathmorrisy (J18) is currently under construction as part of the N17/N18 Gort to Tuam PPP Scheme. A small number of local roads and the Athenry to Oranmore and Galway rail line cross over/under the motorway.

The landscape is characterised by generally flat terrain with some undulation underlain by limestone rock. The land is mainly farmland with some livestock and limited number of trees. There is an active quarry to the north of the M6 and Department of Defence lands to the south. There are no surface water features within the study area.

The Galway Bay Complex Special Area of Conservation (SAC), the Kiltullagh Turlough proposed Natural Heritage Area (NHA), Lough Corrib SAC and Cregganna Marsh Special Protection Area (SPA) are all located approximately 2 to 3km to the west of the study area.

The key constraints for the Study Area are shown on Drawing Y15112-M6-SSR-001 in Appendix A.

4.2 Geometric Appraisal

The main geometric constraints encountered in the identification of suitable locations were achievable weaving distances in relation to adjacent junctions, ramp lengths and the avoidance of existing structures.

The geometric appraisal included an assessment of existing structures and railway infrastructure that might constrain the development of the proposed service area. While a given location may appear initially promising, quite often the frequency of bridge structures along the mainline roadway results in inadequate site frontage to allow for access to the location, or inadequate forward visibility on the approaches to the location. Hence, an assessment of both these existing structures as well as the mainline road geometry in the vicinity of each location was necessary at this stage, with sections deemed to have insufficient frontage being excluded from further consideration.

This assessment returned that there are three potential locations within the study area that could accommodate a junction.

The three locations are shown on drawing Y15112-M6-SSR-002 in Appendix A. A description of the locations and the geometric constraints associated with each location is summarised in Table 4.1 below.

Approximate Chainage	Feature
Ch 134.8 to 133.6  **Figure 4.2.1**: Proposed MSA Location 1	**Location 1** Approx. 1.2km section with proposed junction between Ch: 134.8 to Ch: 133.6 west of Carnmore Accommodation Overbridge. Dumb-bell Grade Separated Junction with Type A Diverge and Type B Merge. A length of approx. 350m falls within the 2km weaving length of junction 19 on M6. Relaxations/ Departures apply associated with relaxation of weaving length to 1km, as per the NRA DMRB TA70/14 and TD22/06. Type A Diverge comprised of 180m direct taper and slip road with minimum length of 295m. The grade separated interchange would be located on a horizontal 3,500m radius. The vertical geometry consists of a 1,200m crest curve which is one step below desirable minimum. It is noted from the site visit that the forward Stopping Sight Distance was good Type B Merge comprise of 230m auxiliary lane and 75m direct taper. Two potential service area sites identified, one each on either side of the motorway.
Ch 133.1 to 131.7  **Figure 4.2.2:** Proposed MSA Location 2	**Location 2** Approx. 2km section with proposed junction between Ch: 133.1 east of accommodation overbridge, to Ch: 131.7, west of Lisheenkyle Overbridge. Dumb-bell Grade Separated Junction with Type A Diverge and Type B Merge. The proposed MSA junction is provided outside the 2km weaving length required as per the NRA DMRB TA70/14 and TD22/06. Type A Diverge comprise of 180m direct taper and slip road with minimum length of 295m. The grade separated interchange would be located on a 7,500m horizontal radius and the vertical geometry consists of a 0.6% gradient. Type B Merge comprise of 230m auxiliary lane and 75m direct taper. There are no Relaxations/ Departures associated with this option. Two potential service area sites identified, one each on either side of the motorway.

Approximate Chainage	Feature
Ch 129.8 to 128.4  **Figure 4.2.3**: Proposed MSA Location 3	**Location 3** Location 3 is at the proposed Rathmorrissy Interchange, part of the N17/N18 Gort to Tuam PPP Scheme. Site Location options under consideration are located in the north west and south east quadrants. The option involves modification of the proposed Rathmorrisy Interchange to accommodate an additional arm for the slip road to lead to the Service Area. The provision of the 5th arm at the roundabout will run over the free-flow slip road and will require provision of an overbridge, which could potentially require lowering of the free-flow slip road. The provision of the 5th arm at the Roundabout would lead to a Departure from Standard as per the updated NRA DMRB TD301. The fifth arm would be located within 50 to 70 m of existing roundabout arms.

Table 4.1: Summary of geometric appraisal

5 Evaluation of Potential Sites

5.1 *Description of Potential Sites*

On consideration of the local constraints and features, the potential sites at each location were identified. A total of six sites were identified, two at each of the three locations.

These sites are shown on drawings Y15112-M6-SSR-003 and Y15112-M6-SSR-004 in Appendix A.

The sites are described in Sections 5.1.1 to 5.1.6.

5.1.1 *Site 1A*

Site 1A is on the northern side of the M6 motorway, approximately 4.5km west of the Rathmorrissy Interchange and 4.5km north east of Oranmore. The land topography is favourable, being flat throughout. The section of M6 mainline onto which the potential site fronts, varies from at grade to slight embankment (maximum of 2.5m).

Sufficient area is available for a single sided service area facility, with no major restrictions or constraints on the boundaries by existing physical features. There is sufficient distance between the overbridge to the east and to the west to locate the grade separated junction required for a single sided service area. A departure for less than a 2km weaving length from Junction 19 may be required to accommodate a grade separated junction, as this location is within the 2km weaving distance required from the junction.

There is an adequate electrical supply available in close proximity to the site location. Details on the telecom services are unknown at this stage but it is likely some upgrades/extension would be required due to the remote nature of the site. Wastewater would have to be pumped approximately 4.5km to Oranmore. Potable water would have to be resourced either from a groundwater well on site or from the existing trunk main on the R339, approximately 1.7km to the north. As there are no surface water features in the vicinity, surface water would be discharged to ground through infiltration trenches/soakaway zones.

There are no noise or visually sensitive locations within 300m of the potential site boundary and residential development is setback over 400m northwest of Site 1A. Eight landowners could be directly affected by the development, with a further four landowners potentially affected by the slip roads. It is likely that the service road access would be via an existing laneway that provides access to farm holdings, running south

from the R339, passing the site before it crosses the mainline and terminates. This access would potentially need to be upgraded along its length back to the R339, a distance of approximately 1.5 to 2km.

The area occupied by the site is underlain by shallow Limestone bedrock with rock head level ranges from 1.2m to 3.10m below ground level (bgl) (N6 Galway to East Ballinasloe Ground Investigation Report). The overburden consists of sands and gravels. Karst features are identified in the general area, with no karst features recorded within the proposed Site 1A, the nearest recorded feature being a cave 600m to the northeast. The site is located over Regionally Important Aquifer bedrock, which is considered to have an extreme vulnerability.

An ESB high voltage line traversing the north of the site will clip the boundary but may not need to be diverted. There is also a medium voltage line traversing the site to the east that will need to be diverted for approximately 700m. There is an existing underground crossing of the motorway that could be used.

There is a recorded archaeological site, an unclassified castle (GA083-021), located approximately 20m to the North West of the site. This castle is marked on the first and revised edition OS maps as "Cloghmoyle castle – in ruins". Further sites in the surrounding area include a ringfort and two possible circular enclosures, which are evident on aerial photography.

The site location is not identified as being of poor drainage or being prone to flooding, nor does it form part of any Designated Conservation Area. The Galway Bay Complex SAC is located approximately 3km to the south west of the site.

Site 1A consists primarily of improved agricultural grassland, which is divided by walled field boundaries. There is an area of scrub in the western part of the site in the vicinity of some apparently derelict buildings. Associated field boundaries also support scattered patches of scrub. These features are quite isolated in an otherwise open landscape and have potential for supporting bat activity (although low) and badger setts.

5.1.2 *Site 1B*

Site 1B is on the southern side of the M6 motorway, approximately 4.5km west of the Rathmorrissy interchange and 4km north east of Oranmore. The land topography is favourable, being flat throughout. The section of M6 mainline onto which the potential site fronts, varies from at grade to slight embankment (maximum of 2.5m).

Sufficient area is available for a single sided service area facility, with no major restrictions or constraints on the boundaries by existing physical features. There is

sufficient distance between the overbridge to the east and to the west to locate the grade separated junction required for a single sided service area. A departure for less than a 2km weaving length from Junction 19 may be required to accommodate a grade separated junction, as this location is within the 2km weaving distance required from the junction.

There is an adequate electrical supply available in close proximity to the site location. Details on the telecom services are unknown at this stage but it is likely some upgrades/extension would be required due to the remote nature of the site. Wastewater would have to be pumped approximately 4km to Oranmore. Potable water would be resourced either from a ground water well on site or from the existing trunk main on the R339, 1.9km to the north. As there are no surface water features in the vicinity, surface water would be discharged to ground through infiltration trenches/soakaway zones.

There is no noise or visually sensitive locations within 300m of the potential site boundary. Lands owned by the Department of Defence and up to three private landowners would be directly affected by the development, with a fourth land owner potentially affected by the location of the grade separated junction and associated slip roads.

It is likely that the service road access would be via an existing laneway, which provides access to farm holdings running south from the R339 and crossing over the mainline via an overbridge before terminating adjacent to the site. This access would potentially need to be upgraded along its length back to the R339, a distance of approximately 2km.

There is an ESB MV line traversing the site, which will need to be diverted over about 600m. There is an existing underground crossing of the motorway that could be used.

The area occupied by the site is underlain by shallow Limestone bedrock. The overburden consists of sands and gravels. Karst features are identified in the general area, with no karst features recorded within the proposed Site 1B, the nearest recorded feature being a cave 600m to the northeast. The site is located over Regionally Important Aquifer bedrock, which is considered to have an extreme vulnerability. The site location lies on a Regionally Important Aquifer bedrock, which is considered to have an extreme vulnerability.

The site is partially under agricultural grassland divided by stone walls in the northern and eastern part. A field boundary close to the M6 has some associated scrub, which may support badger setts. There is no apparent surface water on the site though a series of shallow depressions immediately west of the site may seasonally contain ponded

water. The site extends to include part of a large area of dry limestone heath supporting a wide range of calcicole species. The grasslands in the north of the site may also support a slightly greater floristic diversity than typical improved agricultural grasslands. The site location has experienced no recorded flood events, nor does it form part of any Designated Conservation Area. The Galway Bay Complex SAC is located approximately 3km to the south west of the site.

5.1.3 *Site 2A*

Site 2A is positioned on the northern side of the M6 motorway approximately 3km west of the Rathmorrissy Interchange and 6km north east of Oranmore. The land topography is favourable, being largely flat. The section of M6 mainline onto which the potential site fronts varies from 2.5m embankment at the eastern end to 3.5m cutting to the west.

Sufficient area is available for a single sided service area facility, though the boundary to the north is restricted by an existing quarry. There is sufficient distance between the overbridges to the east and to the west to locate the grade separated junction required for a single sided service area.

There is an adequate electrical supply available in close proximity to the site location. Details on the telecom services are unknown at this stage but it is likely some upgrades/extension would be required due to the remote nature of the site. Wastewater would have to be pumped approximately 5.5km to Oranmore. Potable water would be resourced either from a ground water well on site or from an existing trunk main on the R339, 1.8km to the north. As there are no surface water features in the vicinity, surface water discharge would be to ground through infiltration trenches/soakaway zones.

An overhead ESB high voltage transmission line crosses the middle of the site and will most likely need to be diverted. An overhead medium voltage line clips the northeast corner of the site but should not need to be diverted.

Three landowners would be directly affected by the main body of the development, with a fourth land owner potentially affected by the location of the grade separated junction and associated slip roads. An access road could be constructed back to the L7109, which is approximately 50m from the site.

There is an existing quarry to the north of the site still active (Coshla Quarries Ltd.), which is located just at the northern boundary of the proposed site location. Blast operations at the quarry, approximately eight times per year, have an impact on the noise and vibration levels in the vicinity. There is a two story building between the site and the quarry right at the boundary, which appears to be abandoned. There are six

noise sensitive properties within 300m of the site including one within 50m. The main noise sensitive properties are in a small cluster of houses to the east within 150m of the proposed site.

The area occupied by the site is underlain by shallow Limestone bedrock with rock head level ranging from 0.4 to 3.0m bgl. (N6 Galway to East Ballinasloe Ground Investigation Report). The overburden consists of sand and gravel. Karst features are identified in the general area, with no karst features recorded within the proposed Site 2A, the nearest recorded feature being a cave 700m to the northeast. A quarry is located immediately to the north of the site location.

The site location lies on a Regionally Important Aquifer bedrock, which is considered to have an extreme vulnerability. The underlying groundwater body is located in a SAC water dependent habitat (PA2_005 Clarinbridge / Kinvarra Bay).

The site location is not identified as being of poor drainage or being prone to flooding. However, flooding of the quarry and fields, to the north and west of the site respectively, has occurred in the past including in November 2009 and December 2015. The site does not form part of any Designated Conservation Area.

5.1.4 *Site 2B*

Site 2B is the southern side of the M6 motorway, 3.5km west of the Rathmorrissy interchange and 5.5km north east of Oranmore. The land topography is favourable, being flat throughout. The section of M6 onto which the potential site fronts varies from 2.5m embankment at the eastern end to 3.5m cutting to the west.

Sufficient area is available for a single sided service area facility, with no major restrictions/constraints on the boundaries by the existing physical features. There is sufficient distance between the overbridge to the east and to the west to locate the grade separated junction required for a single sided service area.

There is an adequate electrical supply available in close proximity to the site location. Details on the telecom services are unknown at this stage but it is likely some upgrades/extension would be required due to the remote nature of the site. Wastewater would have to be pumped approximately 5.5km to Oranmore. Potable water would be resourced either from a ground water well on site or from an existing trunk main on the R339, 1.8km to the north. As there are no surface water features in the vicinity, surface water would be discharged to ground through infiltration trenches/soakaway zones.

There are no ESB lines crossing the site. HV lines pass to the east and west of the site but should not need to be diverted.

Five landowners would be directly affected by the development. It is likely that the service road access would be located parallel to the mainline running east from the site to the L7109-D (Lisheenkyle Road) approximately 950m to the east. There are no noise or visually sensitive locations within 300m of the potential site boundary, however a large number of dwellings between 300 to 600m from the site location have clear views of the site.

The area occupied by the site is underlain by shallow Limestone bedrock with rock head level ranging from 0.4 to 3.0m bgl. (N6 Galway to East Ballinasloe Ground Investigation Report). The overburden consists of sand and gravel. Karst features are identified in the general area, with no karst features recorded within the proposed area, the nearest recorded feature being a cave approximately 700m to the northeast. . A quarry is located to the north of the site location on the northern side of the mainline.

The site location lies on a Regionally Important Aquifer bedrock, which is considered to have an extreme vulnerability. The groundwater body is located in a SAC water dependent habitat (PA2_005 Clarinbridge / Kinvarra Bay).

The site location is not identified as being of poor drainage or being prone to flooding and does not form part of any Designated Conservation Area.

5.1.5 *Site 3A*

Site 3A is located on the southeast quadrant of the Rathmorrissy interchange, which is currently under construction.

The land is relatively level to the M6. The M17/M18 interchange, where the roundabout will be located, will be approximately 6m above the level of the M6. The topography is somewhat undulating and falling away from the M6 level.

Sufficient area is available between the east and south arms of the roundabout for the 15ha service area facility, although the standard 500m X 300m dimension will be varied to suit the location at the interchange. The service area would be accessed via a fifth arm on the roundabout. As access will be provided from the roundabout there is no requirement to construct a dedicated grade separated junction. A slip road forming part of the Rathmorrissy interchange would need to be bridged. A departure would be required for the fifth arm on the roundabout. A further road safety issue is potential high circulation speeds on the roundabout.

There is an adequate electrical supply available in close proximity to the site location. Details on the telecom services are unknown at this stage but it is likely some upgrades/extension would be possible from local properties. Wastewater would have

to be pumped approximately 4km to Athenry. Potable water would be resourced either from a ground water well on site or from an existing trunk main on the R348, 1.5km to the south. As there are no surface water features in the vicinity, surface water would be discharged to ground through infiltration trenches/soakaway zones.

There are no ESB lines crossing the site. HV lines pass to the east and west of the site but should not need to be diverted.

Up to five landowners could be directly affected by the development. An access road could be located over 200m along a field access to the east of the site. This connects to a 1.2km access road for houses/fields from the R348, which may need to be widened/upgraded. There are five noise or visually sensitive locations within 300m of the potential site boundary.

The area occupied by the site is underlain by shallow Limestone bedrock. The overburden consists of cobbles and boulders gravel. The site location lies on a Locally Important Aquifer (80%) and a Regionally Important Aquifer (20%), which is considered to have an extreme vulnerability. The groundwater body is located in a SAC water dependent habitat (PA2_005 Clarinbridge / Kinvarra Bay). Karst features are identified in the general area, with no karst features recorded within the proposed Site 3A, the nearest recorded feature being an enclosed depression 800m to the northeast.

Site 3A consists of a series of large agricultural fields on the southern side of the M6 some of which have hedgerows and stone walls dividing them. An area of low-lying ground occurs to the west of the site, which appears prone to flooding and supports wet grassland and scrub. There are no apparent watercourses on site though drainage appears to be to the west towards the adjacent wetland habitat. The site does not form part of any Designated Conservation Area.

5.1.6 *Site 3B*

Site 3B is located on the northwest quadrant of the Rathmorrissy interchange, which is currently under construction.

The land is within 1 to 2m of the M6 level falling towards the local road to the west. The M17/M18 interchange where the roundabout will be located will be approximately 6m above the level of the M6. The topography is somewhat undulating and falling away from M6 level to the west.

Sufficient area is available between the west and north arms of the roundabout for the 15ha service area facility, although the standard 500m X 300m dimension will be varied to suit the location at the interchange. A number of large ESB pylons are located in this

area and may constrain the layout of the MSA. The service area would be accessed via a fifth arm on the roundabout. As access will be provided from the roundabout there is no requirement to construct a dedicated grade separated junction. A slip road forming part of the Rathmorrissy interchange would need to be bridged. A departure would be required for the fifth arm on the roundabout. A further road safety issue is potential high circulation speeds on the roundabout.

There is an adequate electrical supply available in close proximity to the site location. Details on the telecom services are unknown at this stage but it is likely some upgrades/extension would be possible from local properties. Wastewater would have to be pumped approximately 5km to Athenry. Potable water would be resourced either from a ground water well on site or from an existing trunk main approximately 1.7km to the northwest. As there are no surface water features in the vicinity, surface water would be discharged to ground through infiltration trenches/soakaway zones.

ESB high voltage overhead lines pass through the north and east of the proposed site and will most likely need to be diverted including the removal of a large pylon at the proposed entrance. It should also be noted that significant ESB diversions are proposed through the site as part of a Strategic Infrastructure Development (SID) application due to be submitted to ABP by Apple Distribution International. Planning permission for the development of the buildings (planning ref: 15488) was granted by Galway County Council on 10 September 2015. This decision has been appealed to ABP, a decision on the appeal is due by 23 May 2016.

One landowner would be directly affected by the development. It is likely that the service road access would be via the local Caraunduff Road, approximately 50m to the east. There are eight noise or visually sensitive locations within 300m of the potential site boundary, including two within 100m.

The area occupied by the site is underlain by shallow Limestone bedrock. The overburden consists of cobbles and boulders gravel. The site location lies on a Locally Important Aquifer (80%) and a Regionally Important Aquifer (20%), which is considered to have an extreme vulnerability. The groundwater body is located in a SAC water dependent habitat (PA2_005 Clarinbridge / Kinvarra Bay). Karst features are identified in the general area, with no karst features recorded within the proposed Site 3B, the nearest recorded feature being an enclosed depression 800m to the northeast.

The site location is not identified as being of poor drainage or being prone to flooding and does not form part of any Designated Conservation Area.

5.2 Summary of Assessment

5.2.1 Site 1A

The assessment of Site 1A is summarised in Table 5.1.

Criteria		Sub-Criteria	Rating	Comment
Engineering	Traffic Volumes		**Neutral**	Projected 2018 AADT of 37,110 and estimated turn in volume of 8.1%
	Road Safety		**Minor Negative**	A departure will be required at this site as the junction is partly located within the 2km weaving distance of J19 on the M6. Identified as second preferred location in RSA Stage F report.
	Physical Characteristics of the Site	Land Availability & Setting	**Neutral**	No physical constraints.
		Terrain	**Neutral**	Land is generally flat
		Conflicts with existing services	**Minor Negative**	An ESB MV line diversion is likely to be required
		Surface Water features	**Neutral**	None
		Motorway Structures - Culverts/Other	**Neutral**	Two existing mammal crossings to be extended and Garda platform to be removed
		Flooding	**Neutral**	No recorded flooding at the site
	Service/Utility Connections	Potable Water Supply	**Neutral**	Connection available to existing main on R339
		Wastewater Disposal	**Minor Positive**	Possible connection via rising main to Oranmore PS and Mutton Island WWTP. Identified as preferred location following Irish Water feedback.
		Broadband/ Telecommunications	**Neutral**	Broadband available
		Electrical Supply	**Neutral**	Electrical supply available
		Surface Water Outfall	**Neutral**	Outfall available via infiltration
		Local Road Access	**Minor Negative**	A 2km upgrade of a local access track/road required to provide local road access to the site
	Geotechnical		**Neutral**	GSI Website detailed Till derived from Limestone. Limestone bedrock encountered from 2m bgl in BR103 (N6 Galway to Ballinasloe Ground Investigation) (Ranges from 1.2 to 3.1m bgl). Undifferentiated Visean Limestone. Overburden recorded to approx 2m bgl comprising sand and gravels.
Environmental	Air Quality		**Neutral**	Joint preferred site. Population exposure to NOx and PM10 would be neutral if the scheme was developed at these locations. No sensitive receptors within 50m of the scheme.
	Noise		**Neutral**	Joint preferred site: Potential Impact Rating assessed for each site based on number of sensitive receptors in accordance with NRA Guidelines. No sensitive noise receptors within 300m of the potential site.
	Landscape & Visual		**Neutral**	Based on the landscape assessment, the remoteness and the lack of visual receptors the site is deemed joint preferred site from a Landscape and Visual Aspect.

Criteria	Sub-Criteria	Rating	Comment
	Agriculture	**Minor Negative**	The site is assessed as having a negative impact on agriculture and is an intermediate site in comparison with other potential sites.
	Non Agricultural Properties / Material Assets	**Neutral**	Natural amenities, geological resource, public amenities all neutral across the site.
	Ecology	**Minor Negative**	Existing ecological interests - Moderate with areas of scrub or hedgerows which would provide breeding habitat for a range of species; Proximity to Designated Areas - None. The site overall is an Intermediate site from an ecological perspective.
	Archaeology	**Moderate Negative**	A castle site is located c. 20m to the NW and there is general potential in the wider area where a ringfort has been excavated c. 480m to the W and the presence of two further possible enclosures. Least preferred site.
	Architectural & Cultural Heritage	**Neutral**	All of the proposed sites have a neutral impact in terms of the architectural and cultural heritage resource.
	Human Beings / Socio Economic	**Neutral**	Socio economic impact is neutral when compared against all sites. Potential sites have been located to reduce the impact on public amenities / communities.
	Planning	**Neutral**	Landscape value and sensitivity deemed low in assessment of County Plan. No recent planning applications live at any of the sites.
	Geology & Hydrogeology	**Neutral**	Site underlain entirely by Regionally Important Aquifer - Karstified. No public water supply protection areas within the study area. No domestic wells within the study area. Undifferentiated Visean Limestone. No Karst features recorded within site area. Carnmore west Cave located approximately 600m to the north east. The site is outside SAC GW dependent body and on this basis the site is joint preferred overall and ranked as neutral in comparison with other sites.
	Hydrology	**Neutral**	No river in SAC Habitat. No watercourse in vicinity of site - all sites are neutral
	Waste	**Neutral**	Ground Investigation from mainline generally indicates material that could be reused for environmental bunding.
Economy	Benefit cost ratio	**Neutral**	For Sites 1A, 1B, 2A and 2B similar construction costs and marginal differences in turn in rate result in neutral ranking for the BCR across these sites.

Table 5.1: Summary of Site 1A assessment

5.2.2 *Site 1B*

The assessment of Site 1B is summarised in Table 5.2.

Criteria		Sub-Criteria	Rating	Comment
Engineering	Traffic Volumes		**Neutral**	Projected 2018 AADT of 37,110 and estimated turn in volume of 8.1%
	Road Safety		**Minor Negative**	A departure will be required at this site as the junction is partly located within the 2km weaving distance of J19 on the M6. Identified as second preferred location in RSA Stage F report.
	Physical Characteristics of the Site	Land Availability & Setting	**Minor Negative**	No properties within or adjacent to the sites. Proposed site includes land owned by the Dept. of Defence, who have indicated it is actively used, therefore site boundary will be constrained.
		Terrain	**Neutral**	Land is generally flat
		Conflicts with existing services	**Minor Negative**	An ESB MV line traversing the site will need to be diverted over about 600m
		Surface Water features	**Neutral**	None present
		Motorway Structures - Culverts/Other	**Neutral**	Two existing mammal crossings to be extended and Garda platform to be removed
		Flooding	**Neutral**	No recorded flooding at the site
	Service/Utility Connections	Potable Water Supply	**Neutral**	Connection available to existing main on R339
		Wastewater Disposal	**Minor Positive**	Possible connection via rising main to Oranmore PSPS and Mutton Island WWTP. Identified as preferred location following Irish Water feedback.
		Broadband/ Telecommunications	**Neutral**	Broadband available
		Electrical Supply	**Neutral**	Electrical supply available
		Surface Water Outfall	**Neutral**	Outfall available via infiltration
		Local Road Access	**Minor Negative**	A 2km upgrade of a local access track required to provide local road access to the site
	Geotechnical		**Neutral**	Overburden recorded to approx 2m bgl comprising sand and gravels. Undifferentiated Visean Limestone. Limestone bedrock encountered from 2m bgl in BR103. (N6 Galway to Ballinasloe Ground Investigation (Ranges from 1.2-3.1m bgl))
Environmental	Air Quality		**Neutral**	Joint preferred site. Population exposure to NOx and PM10 would be neutral if the scheme was developed at these locations. No sensitive receptors within 50m of the scheme.
	Noise		**Neutral**	Joint preferred site: Potential Impact Rating assessed for each site based on number of sensitive receptors in accordance with NRA Guidelines. No Sensitive noise receptors within 300m of the potential site.
	Landscape & Visual		**Neutral**	Based on the landscape assessment, the remoteness and the lack of visual receptors the site is deemed the preferred site from a Landscape and Visual Aspect.

Criteria	Sub-Criteria	Rating	Comment
	Agriculture	**Neutral**	Site 1B is preferred option based on reduced land take on private agricultural lands, current land use and lower agricultural impact.
	Non Agricultural Properties / Material Assets	**Minor Negative**	Natural amenities, geological resource, public amenities all neutral across the site. Impact on Department of Defence lands.
	Ecology	**Moderate Negative**	Existing ecological interests - Major with areas of scrub or hedgerows which would provide breeding habitat for a range of species and site extends to include part of a large area of dry limestone heath.
	Archaeology	**Minor Negative**	Archaeological potential due to greenfield environment including a partially excavated ringfort, a ring barrow and a megalithic structure within 400m of the site. No direct impact on any recorded archaeological monuments.
	Architectural & Cultural Heritage	**Neutral**	All of the proposed sites have a neutral impact in terms of the architectural and cultural heritage resource.
	Human Beings / Socio Economic	**Neutral**	Socio economic impact is neutral when compared against all sites. Potential sites have been located to reduce the impact on public amenities / communities.
	Planning	**Neutral**	Landscape value and sensitivity deemed low in assessment of County Plan. No recent planning applications live at any of the sites.
	Geology & Hydrogeology	**Neutral**	Site underlain by entirely by Regionally Important Aquifer - Karstified. No public water supply protection areas within the study area. No domestic wells within the study area. Undifferentiated Visean Limestone. No Karst features recorded within site area. Carnmore west Cave located approximately 600m to the north east. The site is outside SAC GW dependent body and on this basis the site is joint preferred overall and ranked as neutral in comparison with other sites.
	Hydrology	**Neutral**	No river in SAC Habitat. No watercourse in vicinity of site - all sites are neutral
	Waste	**Neutral**	Ground Investigation from mainline generally indicates material that could be reused for environmental bunding.
Economy	Benefit cost ratio	**Neutral**	For Sites 1A, 1B, 2A and 2B similar construction costs and marginal differences in turn in rate result in neutral ranking for the BCR across these sites.

Table 5.2: Summary of Site 1B assessment

5.2.3 *Site 2A*

The assessment of Site 2A is summarised in Table 5.3.

Criteria		Sub-Criteria	Rating	Comment
Engineering	Traffic Volumes		Minor Positive	Projected 2018 AADT of 37,110 and estimated turn in volume of 8.3%
	Road Safety		Moderate Positive	Fully compliant with TII standards and no road safety issues identified in the RSIA. Identified as the preferred location in the RSA Stage F Report.
	Physical Characteristics of the Site	Land Availability & Setting	Minor Negative	A quarry located just north of the site is a constraint on the site boundary and layout of the site.
		Terrain	Neutral	Land is generally flat farmland
		Conflicts with existing services	Moderate Negative	An ESB HV line crosses the site and would need to be diverted
		Surface Water features	Neutral	None present
		Motorway Structures - Culverts/Other	Minor Negative	A number of structures including a noise barrier, infiltration pond, mammal crossing, safety barrier and associated deep drainage ditch will be impacted and may need to be moved/extended.
		Flooding	Minor Negative	No recorded flooding at the site. Flooding has occurred at the quarry just to the north of the site and fields to the west of the site occurred in the past including 2009 and 2015.
	Service/Utility Connections	Potable Water Supply	Neutral	Connection available to existing main on R339
		Wastewater Disposal	Minor Negative	Possible connection via rising main to Oranmore PS and Mutton Island WWTP. Identified as least preferred location following Irish Water feedback.
		Broadband/ Telecommunications	Neutral	Broadband available
		Electrical Supply	Neutral	Electrical supply available
		Surface Water Outfall	Neutral	Outfall available via infiltration
		Local Road Access	Minor Positive	Local road access available approximately 50m from site boundary
	Geotechnical		Neutral	Sand and Gravel to approx.. 0.4 to 3m bgl over Limestone. Shallow Bedrock. (TP229, 230, 230A, 230B N6 Galway to Ballinasloe Ground Investigation).
Environmental	Air Quality		Neutral	Joint preferred site. Population exposure to NOx and PM10 would be neutral if the scheme was developed at these locations. No sensitive receptors within 50m of the scheme.
	Noise		Moderate Negative	The site has the highest Potential Impact Rating compared to other sites and is least preferred in terms of noise. The site is also located in close proximity to a large quarry, which will influence the overall ambient noise levels at this site in addition to the M6 mainline.

Criteria	Sub-Criteria	Rating	Comment
	Landscape & Visual	**Moderate Negative**	Based on the landscape assessment and the location of a number of sensitive visual receptors within 300m to the east the site is deemed the joint least preferred site from a Landscape and Visual Aspect.
	Agriculture	**Moderate Negative**	The site is assessed as having a major negative impact on agriculture and is the joint least preferred site in comparison with other potential sites.
	Non Agricultural Properties / Material Assets	**Moderate Negative**	Site is immediately adjacent to an existing quarry. MSA land take could potentially impact quarrying activities.
	Ecology	**Neutral**	Existing ecological Interests - Minor; Proximity to Designated Areas - None. The site overall is a preferred site from an ecological perspective and ranks as neutral.
	Archaeology	**Neutral**	No direct impact on any recorded archaeological monuments. Preferred site.
	Architectural & Cultural Heritage	**Neutral**	All of the proposed sites have a neutral impact in terms of the architectural and cultural heritage resource.
	Human Beings / Socio Economic	**Neutral**	Socio economic impact is neutral when compared against all sites. Potential sites have been located to reduce the impact on public amenities / communities.
	Planning	**Neutral**	Landscape value and sensitivity deemed low in assessment of County Plan. No recent planning applications live at any of the sites.
	Geology & Hydrogeology	**Moderate Negative**	Undifferentiated Visean Limestone. No Karst features recorded within site area. Barretspark Cave located approximately 700m to the north east. Site underlain entirely by Regionally Important Aquifer - Karstified and the underlying groundwater body located in SAC Water dependent habitat. (PA2_005) Clarinbridge / Kinvarra Bay. Least preferred site on this basis.
	Hydrology	**Neutral**	No river in SAC Habitat. No watercourse in vicinity of site - all sites are neutral
	Waste	**Neutral**	Ground Investigation from mainline generally indicates material that could be reused for environmental bunding.
Economy	Benefit **cost ratio**	**Neutral**	For Sites 1A, 1B, 2A and 2B similar construction costs and marginal differences in turn in rate result in neutral ranking for the BCR across these sites.

Table 5.3: Summary of Site 2A assessment

5.2.4 *Site 2B*

The assessment of Site 2B is summarised in Table 5.4.

Criteria		Sub-Criteria	Rating	Comment
Engineering	Traffic Volumes		**Minor Positive**	Projected 2018 AADT of 37,110 and estimated turn in volume of 8.3%
	Road Safety		**Moderate Positive**	Fully compliant with TII standards and no road safety issues identified in the RSIA. Identified as a preferred location in the Road Safety Audit Stage F Report
	Physical Characteristics of the Site	Land Availability & Setting	**Neutral**	There are no properties within the site and closest residential properties are 300m away. No constraints on site boundary.
		Terrain	**Neutral**	Land is generally flat grassed fields
		Conflicts with existing services	**Neutral**	ESB HV lines to east and west of the site boundary but should not need to be diverted.
		Surface Water features	**Neutral**	None present
		Motorway Structures - Culverts/Other	**Minor Negative**	A number of structures including a noise barrier, infiltration pond, mammal crossing, safety barrier and associated deep drainage ditch will be impacted and may need to be moved/extended.
		Flooding	**Neutral**	No recorded flooding at the site
	Service/Utility Connections	Potable Water Supply	**Neutral**	Connection available to existing main on R339
		Wastewater Disposal	**Minor Negative**	Possible connection via rising main to Oranmore PS and Mutton Island WWTP. Identified as least preferred location following Irish Water feedback.
		Broadband/ Telecommunications	**Neutral**	Broadband available
		Electrical Supply	**Neutral**	Electrical supply available
		Surface Water Outfall	**Neutral**	Outfall available via infiltration
		Local Road Access	**Neutral**	1km of new access track along the motorway would be required to connect to a local access road.
	Geotechnical		**Neutral**	Sand and Gravel to approx.. 0.4 to 3m bgl over Limestone. Shallow Bedrock. (TP229, 230, 230A, 230B N6 Galway to Ballinasloe Ground Investigation).
Environmental	Air Quality		**Neutral**	Joint preferred site. Population exposure to NOx and PM10 would be neutral if the scheme was developed at these locations. No sensitive receptors within 50m of the scheme.
	Noise		**Neutral**	Joint preferred site: Potential Impact Rating assessed for each site based on number of sensitive receptors in accordance with NRA Guidelines. No Sensitive noise receptors within 300m of the potential site. Distance from quarry, existing motorway and proposed embankments for interchange construction all mitigate against quarrying impacts.

Criteria	Sub-Criteria	Rating	Comment
	Landscape & Visual	**Minor Negative**	Based on the landscape assessment and the limited number of sensitive visual receptors the site is deemed an Intermediate site from a Landscape and Visual Aspect.
	Agriculture	**Minor Negative**	The site is assessed as having a moderate negative impact on agriculture and is an intermediate site in comparison with other potential sites.
	Non Agricultural Properties / Material Assets	**Minor Negative**	Natural amenities, geological resource, public amenities all neutral across the site. Site is on opposite side of M6 to existing quarry - grade separated interchange will require land take on the quarry side (northern side) of the M6 potentially impacting on quarrying operations.
	Ecology	**Neutral**	Existing ecological interests - Minor; Proximity to Designated Areas - None. The site overall is a preferred site from an ecological perspective.
	Archaeology	**Neutral**	No direct impact on any recorded archaeological monuments. Joint preferred site.
	Architectural & Cultural Heritage	**Neutral**	All of the proposed sites have a neutral impact in terms of the architectural and cultural heritage resource.
	Human Beings / Socio Economic	**Neutral**	Socio economic impact is neutral when compared against all sites. Potential sites have been located to reduce the impact on public amenities / communities.
	Planning	**Neutral**	Landscape value and sensitivity deemed low in assessment of County Plan. No recent planning applications live at any of the sites.
	Geology & Hydrogeology	**Moderate Negative**	Undifferentiated Visean Limestone. No Karst features recorded within site area. Barretspark Cave located approximately 700m to the north east. Site underlain entirely by Regionally Important Aquifer - Karstified and the underlying groundwater body located in SAC Water dependent habitat. (PA2_005) Clarinbridge / Kinvarra Bay. Joint least preferred site on this basis
	Hydrology	**Neutral**	No river in SAC Habitat. No watercourse in vicinity of site - all sites are neutral
	Waste	**Neutral**	Ground Investigation from mainline generally indicates material that could be reused for environmental bunding.
Economy	Benefit cost ratio	**Neutral**	For Sites 1A, 1B, 2A and 2B similar construction costs and marginal differences in turn in rate result in neutral ranking for the BCR across these sites.

Table 5.4: Summary of Site 2B assessment

5.2.5 *Site 3A*

The assessment of Site 3A is summarised in Table 5.5.

Criteria		Sub-Criteria	Rating	Comment
Engineering	Traffic Volumes		**Moderate Positive**	Projected 2018 AADT of 37,110 and estimated turn in volume of 9%
	Road Safety		**Moderate Negative**	Departure required for addition of fifth arm on roundabout. High circulatory speeds on roundabout identified as a risk in both RSIA and RSA Stage F reports. Identified as least preferred site in RSA Stage F report.
	Physical Characteristics of the Site	Land Availability & Setting	**Minor Negative**	Site boundary is constrained by the presence of the Rathmorrissy interchange and a number of properties within 100m of the proposed location.
		Terrain	**Neutral**	Land is generally flat grassland
		Conflicts with existing services	**Neutral**	ESB HV line clips the north of the site but should not need to be diverted. Gas pipeline runs close to the boundary.
		Surface Water features	**Neutral**	None present
		Motorway Structures - Culverts/Other	**Moderate Negative**	A slip road forming part of the interchange will need to be bridged and possibly lowered impacting motorway traffic.
		Flooding	**Neutral**	No recorded flooding at the site
	Service/Utility Connections	Potable Water Supply	**Neutral**	Connection available to existing main on R348
		Wastewater Disposal	**Neutral**	Possible connection via rising main to Athenry treatment works
		Broadband/ Telecommunications	**Neutral**	Broadband available
		Electrical Supply	**Neutral**	Electrical supply available
		Surface Water Outfall	**Neutral**	Outfall available via infiltration
		Local Road Access	**Minor Negative**	Local road access via new access track over 200m of fields connected to local 1.2km access road, which may need to be upgraded
	Geotechnical		**Neutral**	Site located at boundary between Undifferentiated Visean Limestone / Lucan Formation (approx 80:20) of each bedrock formation underneath MSA Site. 0/1.2-2.4m of cobbles and boulders Gravel on rock
Environmental	Air Quality		**Minor Negative**	Least Preferred Site: 1 No. Sensitive receptor within 50m of the site. The population exposure to NOx and PM10 would be increased at Site 3A and therefore this site option is the least preferred.
	Noise		**Minor Negative**	Based on the assessment of noise sensitive receptors within bands up to 300m from the site and rating factors for each band, the site has the third highest Potential Impact Rating compared to other sites and is intermediate in terms of noise.

Criteria	Sub-Criteria	Rating	Comment
	Landscape & Visual	**Moderate Negative**	Based on the landscape assessment and the location of a number of sensitive visual receptors within 300m to the east the site is deemed the joint least preferred site from a Landscape and Visual Aspect.
	Agriculture	**Moderate Negative**	The site is assessed as having a major negative impact on agriculture and is joint least preferred site in comparison with other potential sites.
	Non Agricultural Properties / Material Assets	**Neutral**	Natural amenities, geological resource, public amenities all neutral across the site.
	Ecology	**Minor Negative**	Existing ecological interests - Moderate with areas of wet grassland and scrub; Proximity to Designated Areas - None. The site overall is an intermediate site from an ecological perspective.
	Archaeology	**Minor Negative**	Potential archaeology in the surrounding environment, including three Fulachta Fiadh located 130-170m, to the west of the site. No direct impact on any recorded archaeological monuments. Intermediate site.
	Architectural & Cultural Heritage	**Neutral**	All of the proposed sites have a neutral impact in terms of the architectural and cultural heritage resource.
	Human Beings / Socio Economic	**Neutral**	Socio economic impact is neutral when compared against all sites. Potential sites have been located to reduce the impact on public amenities / communities.
	Planning	**Neutral**	Landscape value and sensitivity deemed low in assessment of County Plan. No recent planning applications live at any of the sites.
	Geology & Hydrogeology	**Minor Negative**	Site is underlain by a Locally Important Aquifer (bedrock which is moderately productive in local areas) and a Regionally Important Aquifer (80:20). Groundwater body located in SAC Water dependent habitat. (PA2_005) Clarinbridge / Kinvarra Bay. Site located at boundary between Undifferentiated Visean Limestone / Lucan bedrock formation underneath MSA Site. Approximately 800m south west of enclosed depression listed as karst feature. Intermediate Site
	Hydrology	**Neutral**	No river in SAC Habitat. No watercourse in vicinity of site - all sites are neutral
	Waste	**Neutral**	Ground Investigation from mainline generally indicates material that could be reused for environmental bunding.
Economy	Benefit cost ratio	**Minor Positive**	With lower construction costs (no grade separated junction required) and slightly higher turn in rate, Sites 3A and 3B rank as the preferred sites in terms of BCR.

Table 5.5: Summary of Site 3A assessment

5.2.6 *Site 3B*

The assessment of Site 3B is summarised in Table 5.6.

Criteria		Sub-Criteria	Rating	Comment
Engineering	Traffic Volumes		**Moderate Positive**	Projected 2018 AADT of 37,110 and estimated turn in volume of 9%
	Road Safety		**Moderate Negative**	Departure required for addition of fifth arm on roundabout. High circulatory speeds on roundabout identified as a risk in both RSIA and RSA Stage F reports. Identified as least preferred site in RSA Stage F report.
	Physical Characteristics of the Site	Land Availability & Setting	**Minor Negative**	Site boundary is constrained by the presence of the Rathmorrissy interchange and a number of properties within 100m of the proposed location.
		Terrain	**Neutral**	Land is generally flat grassland
		Conflicts with existing services	**Moderate Negative**	ESB HV line running through the north and east of the site would have to be diverted including relocation of at least one large pylon located close to the entrance slip road from the interchange. Gas pipeline runs close to the boundary.
		Surface Water features	**Neutral**	None present
		Motorway Structures - Culverts/Other	**Moderate Negative**	A slip road forming part of the interchange will need to be bridged and possibly lowered impacting on motorway traffic.
		Flooding	**Neutral**	No recorded flooding at the site
	Service/Utility Connections	Potable Water Supply	**Neutral**	Connection available to existing main on L3103
		Wastewater Disposal	**Neutral**	Possible connection via rising main to Athenry treatment works.
		Broadband/ Telecommunications	**Neutral**	Broadband available
		Electrical Supply	**Neutral**	Electrical supply available
		Surface Water Outfall	**Neutral**	Outfall available via infiltration
		Local Road Access	**Minor Positive**	Local road access within 50m
	Geotechnical		**Neutral**	Site located at boundary between Undifferentiated Visean Limestone / Lucan Formation (approx 80:20) of each bedrock formation underneath MSA Site. 0/1.2-2.4m of cobbles and boulders gravel on rock
Environmental	Air Quality		**Neutral**	Joint preferred site. Population exposure to NOx and PM10 would be neutral if the scheme was developed at these locations. No sensitive receptors within 50m of the scheme.
	Noise		**Moderate Negative**	Based on the assessment of noise sensitive receptors within bands up to 300m from the site and rating factors for each band. The site has the highest Potential Impact Rating compared to other sites and is joint least preferred in terms of noise.

Criteria	Sub-Criteria	Rating	Comment
	Landscape & Visual	**Moderate Negative**	Based on the landscape assessment and the location of a number of sensitive visual receptors within 300m to the north west the site is deemed the joint least preferred site from a Landscape and Visual Aspect.
	Agriculture	**Moderate Negative**	The site is assessed as having a major negative impact on agriculture and is joint least preferred site in comparison with other potential sites.
	Non Agricultural Properties / Material Assets	**Neutral**	Natural amenities, geological resource, public amenities all neutral across the site.
	Ecology	**Neutral**	Existing ecological interests - Minor; Proximity to Designated Areas - None. The site overall is a joint preferred site from an ecological perspective.
	Archaeology	**Neutral**	No direct impact on any recorded archaeological monuments. Joint preferred site.
	Architectural & Cultural Heritage	**Neutral**	All of the proposed sites have a neutral impact in terms of the architectural and cultural heritage resource.
	Human Beings /Socio Economic	**Neutral**	Socio economic impact is neutral when compared against all sites. Potential sites have been located to reduce the impact on public amenities / communities.
	Planning	**Neutral**	Landscape value and sensitivity deemed low in assessment of County Plan. No recent planning applications live at any of the sites.
	Geology & Hydrogeology	**Minor Negative**	Site is underlain by a Locally Important Aquifer (bedrock which is moderately productive in local areas) and a Regionally Important Aquifer (80:20). Groundwater body located in SAC Water dependent habitat. (PA2_005) Clarinbridge / Kinvarra Bay. Site located at boundary between Undifferentiated Visean Limestone / Lucan bedrock formation underneath MSA Site. Approximately 800m south west of enclosed depression listed as karst feature. Intermediate Site.
	Hydrology	**Neutral**	No river in SAC Habitat. No watercourse in vicinity of site - all sites are neutral
	Waste	**Neutral**	Ground Investigation from mainline generally indicates material that could be reused for environmental bunding.
Economy	Benefit cost ratio	**Minor Positive**	With lower construction costs (no grade separated junction required) and slightly higher turn in rate, Sites 3A and 3B rank as the preferred sites in terms of BCR.

Table 5.6: Summary of Site 3B assessment

5.3 Options Comparison

Table 5.7 compares the potential sites across all the criteria.

Criteria		Sub-Criteria	Site 1A	Site 1B	Site 2A	Site 2B	Site 3A	Site 3B
Engineering	Traffic Volumes		Neutral	Neutral	Minor Positive	Minor Positive	Moderate Positive	Moderate Positive
	Road Safety		Minor Negative	Minor Negative	Moderate Positive	Moderate Positive	Moderate Negative	Moderate Negative
	Physical Characteristics of the Site	Land Availability & Setting	Neutral	Minor Negative	Minor Negative	Neutral	Minor Negative	Minor Negative
		Terrain	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
		Conflicts with existing services	Minor Negative	Minor Negative	Moderate Negative	Neutral	Neutral	Moderate Negative
		Surface Water features	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
		Motorway Structures – Culverts / Other	Neutral	Neutral	Minor Negative	Minor Negative	Moderate Negative	Moderate Negative
		Flooding	Neutral	Neutral	Minor Negative	Neutral	Neutral	Neutral
	Service/Utility Connections	Potable Water Supply	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
		Wastewater Disposal	Minor Positive	Minor Positive	Minor Negative	Minor Negative	Neutral	Neutral
		Broadband / Telecommunications	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
		Electrical Supply	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
		Surface Water Outfall	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
		Local Road Access	Minor Negative	Minor Negative	Minor Positive	Neutral	Minor Negative	Minor Positive
	Geotechnical		Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Environmental	Air Quality		Neutral	Neutral	Neutral	Neutral	Minor Negative	Neutral
	Noise		Neutral	Neutral	Moderate Negative	Neutral	Minor Negative	Moderate Negative
	Landscape & Visual		Neutral	Neutral	Moderate Negative	Minor Negative	Moderate Negative	Moderate Negative
	Agriculture		Minor Negative	Neutral	Moderate Negative	Minor Negative	Moderate Negative	Moderate Negative
	Non Agricultural Properties / Material Assets		Neutral	Minor Negative	Moderate Negative	Minor Negative	Neutral	Neutral
	Ecology		Minor Negative	Moderate Negative	Neutral	Neutral	Minor Negative	Neutral
	Archaeology		Moderate Negative	Minor Negative	Neutral	Neutral	Minor Negative	Neutral

Criteria	Sub-Criteria	Site 1A	Site 1B	Site 2A	Site 2B	Site 3A	Site 3B
	Architectural & Cultural Heritage	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
	Human Beings \ Socio Economic	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
	Planning	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
	Geology & Hydrogeology	Neutral	Neutral	Moderate Negative	Moderate Negative	Minor Negative	Minor Negative
	Hydrology	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
	Waste	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Economy	Benefit cost ratio	Neutral	Neutral	Neutral	Neutral	Minor Positive	Minor Positive

Table 5.7: Comparison of assessment across all sites

Key differentiating issues between the sites include:

- Traffic volumes;
- Road safety;
- Conflicts with existing services;
- Wastewater disposal;
- Local road access;
- Noise;
- Landscape and visual;
- Agriculture;
- Non-agricultural properties / material assets;
- Ecology;
- Archaeology; and
- Geology and Hydrogeology.

Traffic volumes turning in to a MSA at Sites 3A and3B are assumed to be higher than at sites at the other locations as they are located at the interchange between the M6 and M17/M18 motorways. For Sites 1A and 1B, turn in volumes are assumed to be lowest as they are located furthest away from the Rathmorrissy Interchange. Further details on the assumptions used when calculating the turn in rates are included in Section 3.3.1 and Appendix B.

In terms of road safety, four of the six sites are likely to require departures from standards. Sites 1A and 1B will require a departure as a 350m length of the sites is located within the 2km weaving distance of Junction 19 on the M6. Sites 3A and 3B will require a departure for the fifth arm on the roundabout at Junction 18 (currently under construction). There are no road safety issues at Sites 2A or 2B, resulting in sites at this location having a clear benefit over sites at the other two locations.

There are a significant number of low, medium and high voltage electricity lines in the vicinity, requiring diversions at Sites 1A and 1B (medium), 2A (high) and 3B (high). At least one large HV pylon located at the proposed entrance to the MSA from the interchange will need to be relocated at Site 3B. Site 3B may also be impacted by a Strategic Infrastructure Development application due to be submitted to ABP, which may include electricity diversions through the proposed site.

All sites will impact on existing motorway structures but sites 1A and 1B are likely to have the least impact while sites 3A and 3B will have the greatest impact, due to their impact on the Rathmorrissy Interchange.

Sites 1A and 1B are identified as the preferred sites for wastewater disposal as they are closest to existing assets in Oranmore. Sites 2A and 2B are least preferred as they are farthest away from either Oranmore or Athenry.

Local road access may be difficult and require extensive new/upgraded access tracks across farmland at three of the six sites (1A, 1B and 3A).

The noise, landscape and visual and agriculture criteria rankings reflect the proximity of some of the sites to residential properties and sensitive farming industries. Sites 2A, 3A and 3B have been ranked as moderate negative for both criteria when compared to other sites. This is due to the presence of properties, farm buildings and sensitive farming enterprises close to the sites. From a landscape and visual perspective, the preferred sites in this criterion are sites 1A and 1B. Site 1B is the preferred site in the agriculture criterion.

Site 1B is the least preferred site from an ecology perspective due to the potential for the site to extend into a dry limestone heath supporting a wide range of calcicole species. The grasslands in the north of the site may also support a slightly greater floristic diversity than typical improved agricultural grasslands. Sites 1A and 3A have a minor negative ranking due to their potential to support badger setts and bat activity. The remaining sites have a neutral ranking.

A castle site is located approximately 20m to the northwest of Site 1A and there is general archaeological potential in the wider area where a ringfort has been excavated within 500m to the west and the presence of two further possible enclosures. This has resulted in site 1A being least preferred from an archaeological perspective and ranked as moderate negative. Sites 1B and 3A have been ranked as minor negative due to their archaeological potential, while the remaining sites are considered as neutral.

Sites 2A and 2B are least preferred from a Groundwater and Hydrogeology perspective as they are located in a regionally important aquifer of extreme vulnerability and the underlying groundwater body is located in a SAC water dependent habitat.

6 Recommendation

6.1 Identification of preferred site

On the basis of the assessment undertaken to date, Site 2B is the preferred site. The main differentials between Site 2B and the other sites are road safety and the isolated nature of the site resulting in reduced impact on sensitive receptors. Site 2B also has benefits over some other sites in terms of conflicts with existing services (none), noise, ecology and archaeology.

Site 2B has a clear benefit over the other sites in the engineering assessment and is one of the preferred sites, with Site 1A and 1B, in the environmental assessment. It is ranked as neutral in the economic assessment along with Sites 1A, 1B and 2A. Sites 3A and 3B have a minor positive economic ranking as the construction costs for a MSA at the Rathmorrissy Interchange are lower than on the M6 as a grade separated junction is not required.

There are some negative issues to be considered with Site 2B including its location within a regionally important aquifer. During the Preliminary Design Stage, mitigation measures can be developed/applied to address these issues using best practice and experience of previous TII MSA's. However, on balance across all criteria, Site 2B has the most benefit and is therefore the preferred site. It is therefore recommended that Site 2B is progressed to the next stage, Preliminary Design.

Appendix A

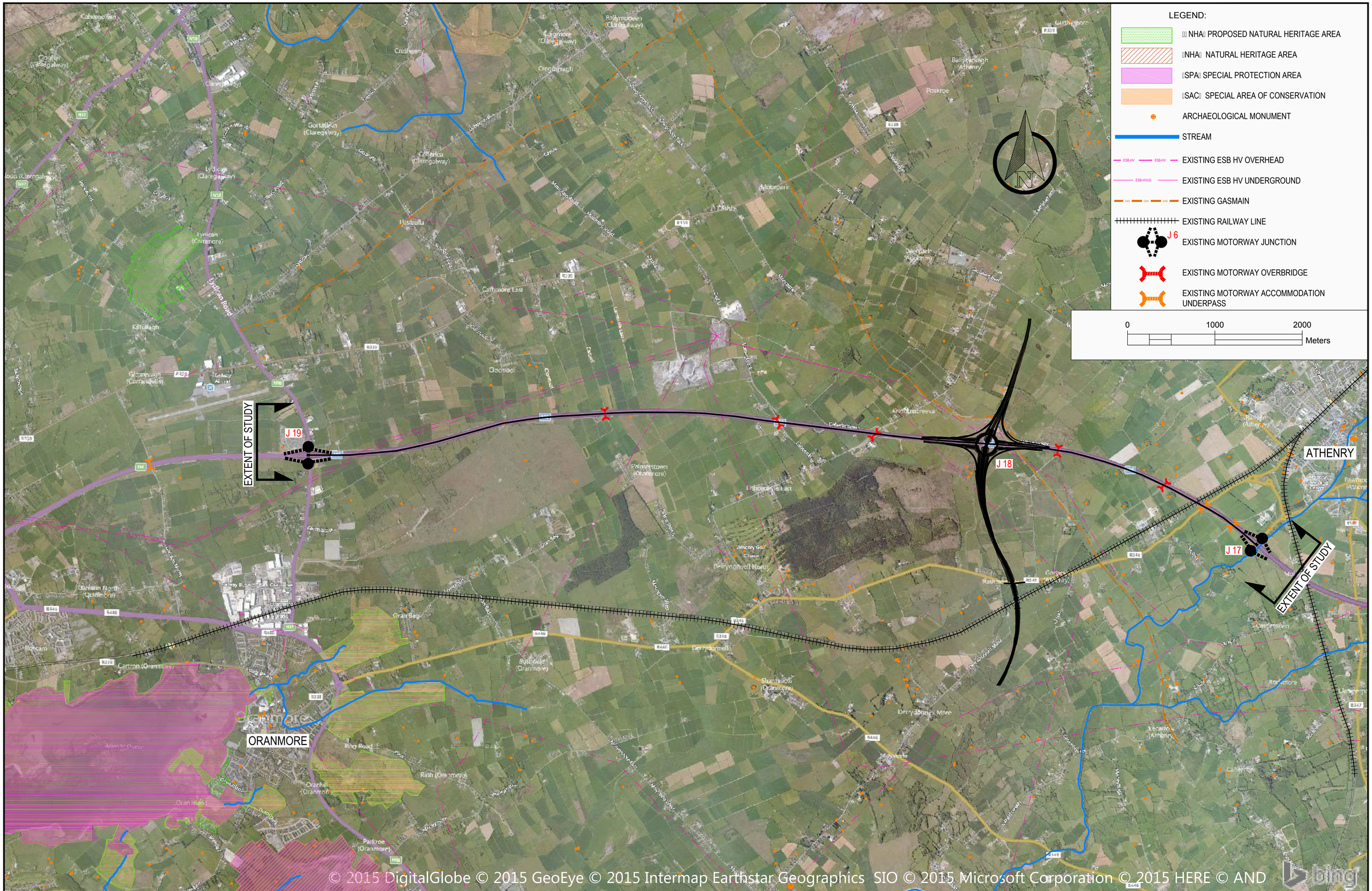
Drawings

Y15112-M6-SSR-001 – Study Area Showing Key Constraints for M6(M17/M18) Service Area

Y15112-M6-SSR-002 – Alignment Appraisal for M6(M17/M18) Service Area

Y15112-M6-SSR-003 – Site Locations for M6(M17/M18) Service Area

Y15112-M6-SSR-004 – Site Locations for M6(M17/M18) Service Area



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Rev.	Date	By	Amendments
A	11.09.15	RO'B/PM	INFORMATION

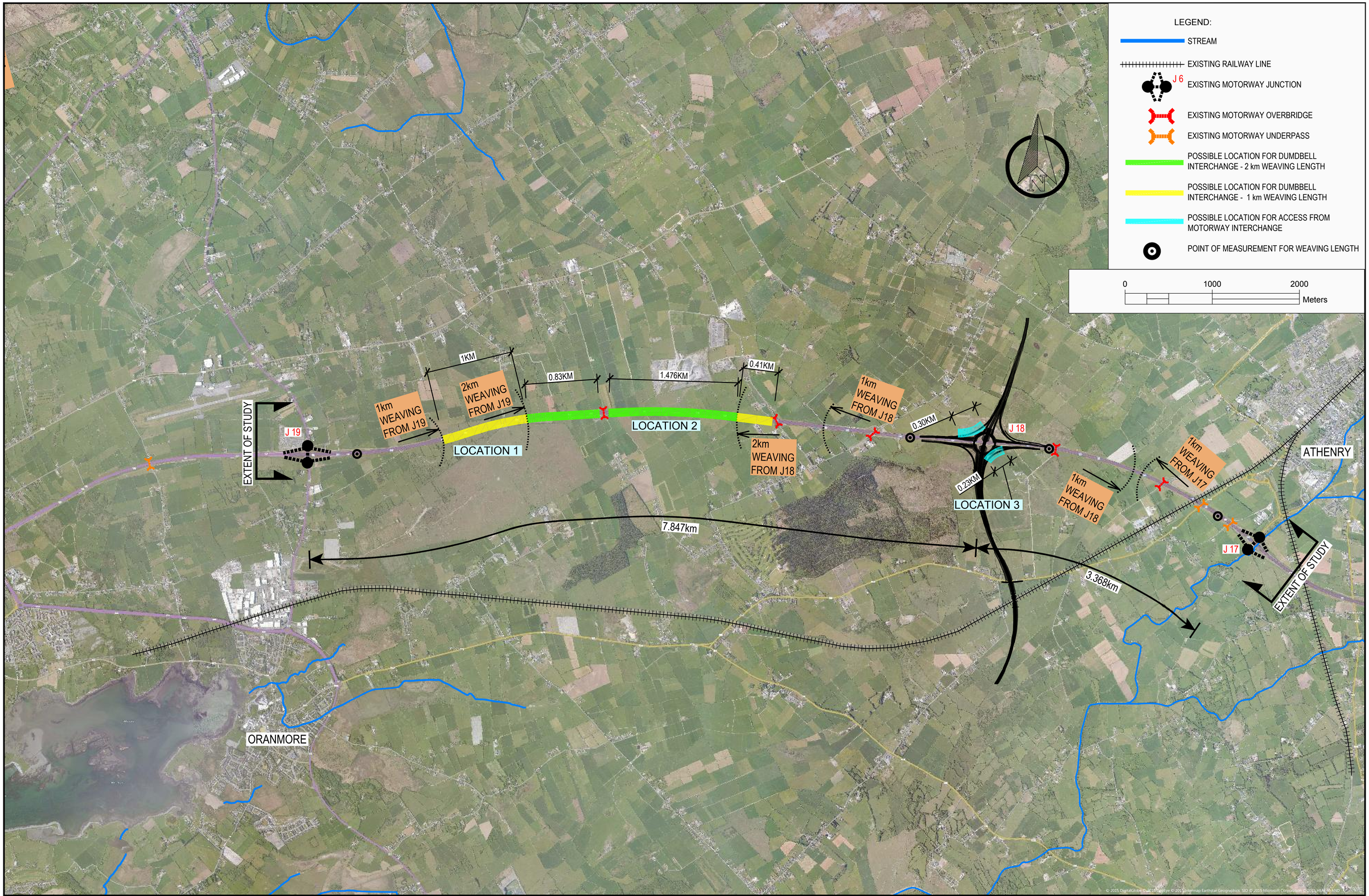
Job

TRANCHE 4 MOTORWAY SERVICE AREAS

Title

STUDY AREA SHOWING KEY CONSTRAINTS FOR M6 (M17/M18) SERVICE AREA

Issue Details			Office Use Only	
Designed: RS	Draft	X	Job No. Y15112	
Drawn: RO'B	Approval		Date: SEPTEMBER 2015	
Checked: CD	Tender		Drawing No. Y15112-M6-SSR-001	Rev. A
Approved: PM	Construction			
Scale: 1:20,000 @ A1 1:40,000 @ A3	Record		File Ref. Y15112	



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Rev.	Date	By	Amendments
A	11.09.15	RO'B/PM	INFORMATION

Job

TRANCHE 4 MOTORWAY SERVICE AREAS

Title

ALIGNMENT APPRAISAL FOR M6 (M17/M18) SERVICE AREA

Issue Details			Office Use Only	
Designed: RS	Draft	X	Job No. Y15112	
Drawn: RO'B	Approval		Date: SEPTEMBER 2015	
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Approved: PM	Construction			
Scale: 1:20,000 @ A1, 1:40,000 @ A3	Record		File Ref. Y15112	

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Rev.	Date	By	Amendments
C	18.11.15	PM / GT	CHAINAGES AMENDED
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A	11.09.15	RO'B / PM	INFORMATION

Job

TRANCHE 4 MOTORWAY SERVICE AREAS

Title

SITE LOCATIONS
M6 (M17/M18) SERVICE AREA

Issue Details			Office Use Only	
Designed: RS	Draft	X	Job No. Y15112	
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Approved: PM	Construction			
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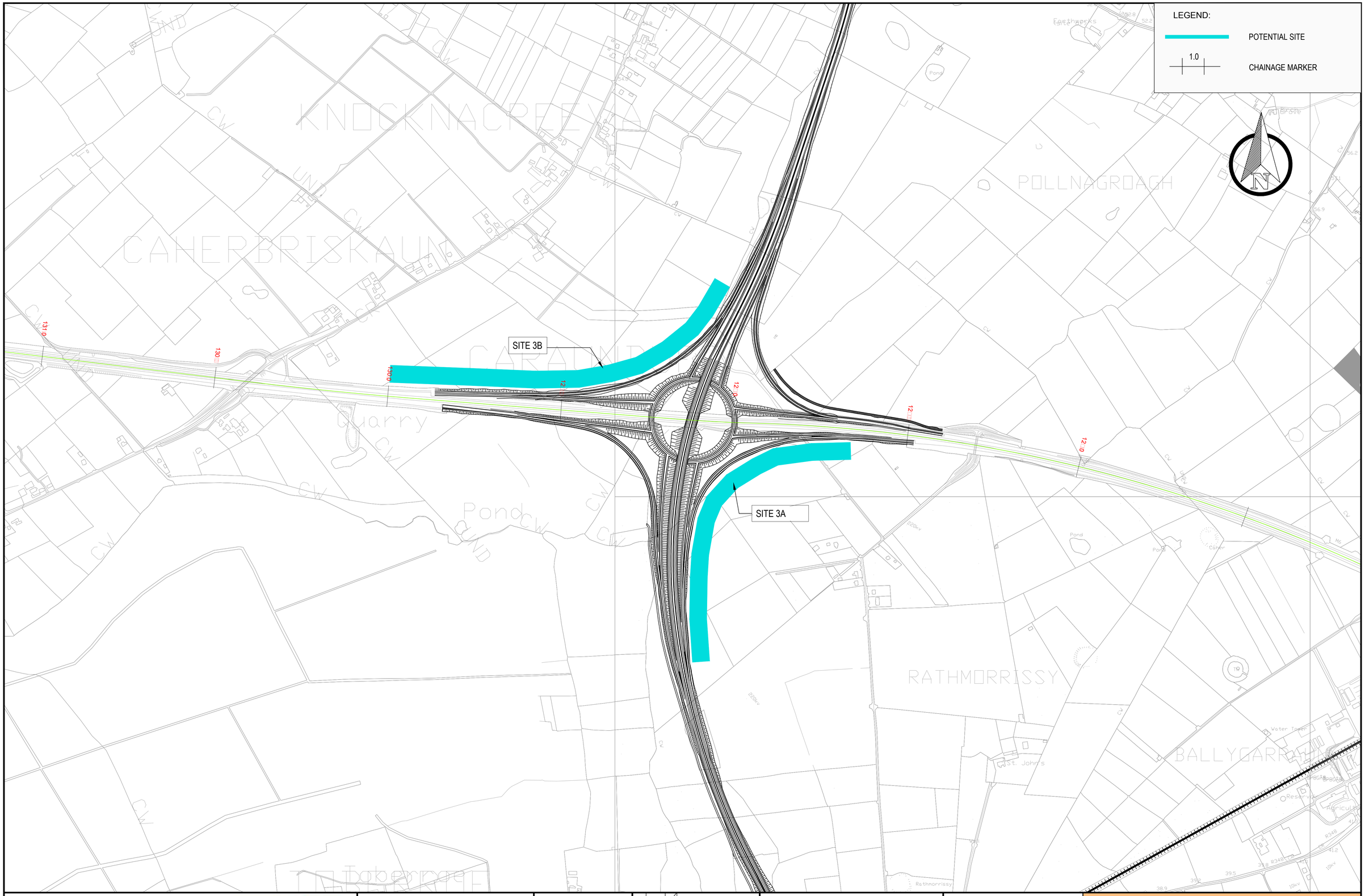

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C	18.11.15	PM / GT	CHAINAGES AMENDED
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A	11.09.15	ROB / PM	INFORMATION

Job

TRANCHE 4 MOTORWAY SERVICE AREAS

Title

SITE LOCATIONS
M6 (M17/M18) SERVICE AREA

Issue Details			Office Use Only	
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Drawn: ROB	Approval		Date: SEPTEMBER 2015	
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Approved: PM	Construction			
Scale: 1:5,000 @ A1 1:10,000 @ A3	Record		File Ref. Y15112	

Appendix B

Turn in rate calculations

2018 Constant Growth AADT's							
Scenario A: Service Area Between Junction 18-19 at Location 1							
movement	**Total Traffic Volume**	**% of junction traffic**	**veh type**	**Traffic Volume**	***Turn In %***	**Total Turn In Traffic**	**Total Turn In**
M6W to M17	4,868	13%	*LGV*	4,625	*10%*	462	487
			HGV	243	*10%*	24	
M6W to M6E	9,315	25%	*LGV*	8,849	*10%*	885	931
			HGV	466	*10%*	47	
M6W to M18	228	1%	*LGV*	217	*10%*	22	23
			HGV	11	*10%*	1	
M17 to M6W	4,315	12%	*LGV*	4,099	*10%*	410	431
			HGV	216	*10%*	22	
M17 to M18	1,656	4%	*LGV*	1,574	*1%*	16	17
			HGV	83	*2%*	2	
M17 to M6E	1,503	4%	*LGV*	1,428	*1%*	14	16
			HGV	75	*2%*	2	
M6E to M17	1,670	4%	*LGV*	1,586	*1%*	16	18
			HGV	83	*2%*	2	
M6E to M6W	9,315	25%	*LGV*	8,849	*10%*	885	931
			HGV	466	*10%*	47	
M6E to M18	624	2%	*LGV*	593	*1%*	6	7
			HGV	31	*2%*	1	
M18 to M6W	1,186	3%	*LGV*	1,127	*10%*	113	119
			HGV	59	*10%*	6	
M18 to M17	1,656	4%	*LGV*	1,574	*1%*	16	17
			HGV	83	*2%*	2	
M18 to M6E	773	2%	*LGV*	735	*1%*	7	8
			HGV	39	*2%*	1	
Total Traffic =	**37,110**				**Total Turn In =**		**3,006**
					average		8.1%

2018 Constant Growth AADT's							
Scenario B: Service Area Between Junction 18-19 at Location 2							
movement	**Total Traffic Volume**	**% of junction traffic**	**veh type**	**Traffic Volume**	***Turn In %***	**Total Turn In Traffic**	**Total Turn In**
M6W to M17	4,868	13%	*LGV*	4,625	*10%*	462	487
			HGV	243	*10%*	24	
M6W to M6E	9,315	25%	*LGV*	8,849	*10%*	885	931
			HGV	466	*10%*	47	
M6W to M18	228	1%	*LGV*	217	*10%*	22	23
			HGV	11	*10%*	1	
M17 to M6W	4,315	12%	*LGV*	4,099	*10%*	410	431
			HGV	216	*10%*	22	
M17 to M18	1,656	4%	*LGV*	1,574	*2%*	31	34
			HGV	83	*3%*	2	
M17 to M6E	1,503	4%	*LGV*	1,428	*2%*	29	31
			HGV	75	*3%*	2	
M6E to M17	1,670	4%	*LGV*	1,586	*2%*	32	34
			HGV	83	*3%*	3	
M6E to M6W	9,315	25%	*LGV*	8,849	*10%*	885	931
			HGV	466	*10%*	47	
M6E to M18	624	2%	*LGV*	593	*2%*	12	13
			HGV	31	*3%*	1	
M18 to M6W	1,186	3%	*LGV*	1,127	*10%*	113	119
			HGV	59	*10%*	6	
M18 to M17	1,656	4%	*LGV*	1,574	*2%*	31	34
			HGV	83	*3%*	2	
M18 to M6E	773	2%	*LGV*	735	*2%*	15	16
			HGV	39	*3%*	1	
Total Traffic =	**37,110**				**Total Turn In =**		**3,084**
					average		8.3%

2018 Constant Growth AADT's							
Scenario C: Service Area at Junction 18							
Movement	Total Traffic Volume	% of junction traffic	Veh. Type	Traffic Volume	*Turn In %*	Total Turn In Traffic	Total Turn In
M6W to M17	4,868	13%	*LGV*	4,625	*9%*	416	438
			HGV	243	*9%*	22	
M6W to M6E	9,315	25%	*LGV*	8,849	*9%*	796	838
			HGV	466	*9%*	42	
M6W to M18	228	1%	*LGV*	217	*9%*	20	21
			HGV	11	*9%*	1	
M17 to M6W	4,315	12%	*LGV*	4,099	*9%*	369	388
			HGV	216	*9%*	19	
M17 to M18	1,656	4%	*LGV*	1,574	*9%*	142	149
			HGV	83	*9%*	7	
M17 to M6E	1,503	4%	*LGV*	1,428	*9%*	128	135
			HGV	75	*9%*	7	
M6E to M17	1,670	4%	*LGV*	1,586	*9%*	143	150
			HGV	83	*9%*	8	
M6E to M6W	9,315	25%	*LGV*	8,849	*9%*	796	838
			HGV	466	*9%*	42	
M6E to M18	624	2%	*LGV*	593	*9%*	53	56
			HGV	31	*9%*	3	
M18 to M6W	1,186	3%	*LGV*	1,127	*9%*	101	107
			HGV	59	*9%*	5	
M18 to M17	1,656	4%	*LGV*	1,574	*9%*	142	149
			HGV	83	*9%*	7	
M18 to M6E	773	2%	*LGV*	735	*9%*	66	70
			HGV	39	*9%*	3	
Total Traffic =	**37,110**				**Total Turn In =**		**3,340**
					average		9.0%