TOM PHILLIPS + ASSOCIATES
TOWN PLANNING CONSULTANTS

8 - 11 Lower Baggot Street, Dublin 2, Ireland
Tel +353 1 478 6055 Fax +353 1 478 6054 info@tpa.ie www.tpa.ie

The Secretary
An Bord Pleanála
64 Marlborough Street
Dublin 1

Wednesday, 15th September 2004

By Hand

Dear Sir

RE: CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD AND FOR A PEAT DEPOSITION SITE, BELLAGELLY SOUTH, SRAHMORE, ATTAVALLY, BANGOR ERRIS, CO. MAYO

Mayo County Council Register Reference: P03/3343

An Bord Pleanála Ref: PL16.207212

1.0 INTRODUCTION

1.1 Purpose of this Response

Tom Phillips + Associates, 8-11 Lower Baggot Street, Dublin 2 prepared this response in association with ROBIN Consulting Engineers, RSK ENSR, and the Applicant. The response has been prepared on behalf of the Applicant, Shell E & P Ireland Limited, Corrib House, 52 Lower Leeson Street, Dublin 2, in response to a letter from the Board, dated 27th August 2004, requesting the submission of further information on two items in accordance with section 132 of the *Planning and Development Act, 2000*.

Key Items Arising

The two items requested by the Board relate to the following issues:

1. Roads and Transportation.
2. Phosphorous.

For ease of reference we have repeated the text of the Board's letter under each the above headings followed by the Applicant's response in Section 2.0 below.

Documents Appended

The following documents are appended in a bound folder to this Response:

Appendix 1

- *Shell E&P Ireland Ltd. Response to items raised by An Bord Pleanala Tobin Road Drawings:*
  - Dwg. No. 2044-1001 Rev. A – *Layout Plan Showing Terminal Site, Haul Route and Peat Deposition Site* (1:25,000).
  - Dwg. No. 2044-1002 Rev. A – *Keyplan to Layout Plans* (1:15,000).
  - Dwg. No. 2044-1011 Rev. A – *Layout Plan & Longitudinal Section of Haul Road Sheet 7 of 7*(1:2500 – Horiz. 1:2500; Vert. 1:250).
  - Dwg. No. 2044-1012 Rev. A – *Layout Plan & Longitudinal Section of return Route R313 & L12044* (1:2500 – Horiz. 1:2500; Vert. 1:250).
  - Dwg. No. 2044-1018 *Additional Typical Cross sections for Roads, Types G1 & G2* (1:50).
  - Dwg. No. 2044-1019 *Details of Proposed Turning Movements Rigid Truck* (1:500).
  - Dwg. No. 2044-1020 *Details of Proposed Visibility at Junctions* (1:1000).
  - Dwg. No. 2044-1021 *Details of Proposed Traffic Management* (NTS)
  - Dwg. No. 2044-1022 *Details of Proposed Turning Movements Articulated Truck* (1:500).
  - Dwg. No. 2044-1023 *Details of Proposed One Way Loop at Srahmore* (1:2000).
  - TDK CD-R80 Compact Disk [to facilitate reading and enlargement of the drawings on computer screen].

Note: The 1:2,500 Location Maps illustrated on certain drawings are derived from the Ordnance Survey Plan Bases, surveyed in the early 1900's; the corresponding Road Survey drawings are based on modern GPS-derived surveys. Therefore, there is a slight difference in alignments illustrated due to the different survey techniques.

The following documents are appended to this Response:

Appendix 2.1

- (UK) National Rivers Authority (NRA) Leaching Test (standard prep. test for leachability of chemicals from soil) (method statement attached).

Appendix 2.2

- Vanadomolydbophoshoric Acid Colorimetric Method (UKAS accredited) (brief method statement).

Appendix 2.3

- Results of Orthophosphate Concentrations Measured on Terminal Site.

1.2 General Commentary on the Board's Request

The response reflects the Project Team's interpretation of the further information items sought by the Board. The aim of the response is to give an objective and comprehensive answer to each of the items raised, based on our collective interpretation and understanding of the Board's request.

As with the previous Further Information request by the Board, the questions posed by the Board are of a detailed technical nature. Every effort has been made by the Applicant and its advisors to provide detailed answers and explanations in response to the letter; however, without direct communication and interaction between the Board's and Applicant's technical experts, it is difficult to ensure that every aspect of these questions has been interpreted correctly, and the relevant explanation provided.

Accordingly, the Applicant and the Project Team would be happy to clarify any item arising, to ensure that a thorough response is presented to the Board to facilitate determination of the Appeal.

2.0 RESPONSE TO THE ITEMS RAISED BY THE BOARD

2.1 Roads and Transportation

Before addressing the Board's request under this heading in detail, the Applicant clarifies that the proposed one-way system for traffic on the R313-L12044-L1204 loop at the southern end of the haul route requires a statutory variation to the current position. It will apply to all traffic and will be implemented by Mayo County Council under the *Roads Act, 1993*. (See Dwg. No. 2044-1023 *Details of Proposed One Way Loop at Srahmore* (1:2000) attached.)

The publication on 23rd June 2004 of the proposed works by Mayo County Council under Part VIII of the *Planning and Development Act, 2000*, highlighted the one-way system; this constitutes the formal public consultation process, which ended on August 6th, 2004. The item has been formally brought before the Belmullet Elected Members of the Council, and is on the agenda for formal approval at the next full Council meeting.

Open Days held by Applicant in November 2003 further explained the proposed one-way system to residents and to public transport operators in the area. Consultation took place with the Gardaí in December 2003, and on the Open Days. This consultation explained the proposed one-way system to them and secured their acceptance of it. The traffic management system described in this response is in accordance with the Part VIII Documents published by Mayo County Council. This response has been subject to detailed consultation and agreement between the Applicant and the Roads Section of Mayo County Council.

2.1.1 Item 1

The Board requested the following:

1. *'Submit details of sight distances and turning radii at all junctions on the proposed Haul Route and the return route, indicating how it is proposed that haulage vehicles can safely make the required manoeuvres. The Junctions concerned are as follows:*
    - *R314/L1204*
    - *R313/L1204*
    - *R313/L12044*
    - *L12044/L1204*

    It is expected that these details will include scaled drawings of each of the junctions and their approaches, and information relating to any land acquisition and/or other improvements proposed.

    Details should also be provided of the precise duties of the Traffic Director and Flagmen at the above junctions and proposals for junctions at which control is not proposed.

2.1.2 Response to Item 1

Sight Distances and Turning Radii at all Junctions

These items are addressed in the scaled drawings appended in Appendix 1:

- Dwg. No. 2044-1019 *Details of Proposed Turning Movements Rigid Truck* (1:500).

  This drawing illustrates details of proposed turning movements for rigid trucks at the following junctions:

  - L12044/R313 Junction.
  - L12044/Local Access.
  - L12044/L1204 Junction.
  - L1204/R313/Bord na Mona Junction.
  - Bellanaboy Terminal Access/R314 Junction.
  - L1204/R314 Junction.

- Dwg. No. 2044-1020 *Details of Proposed Visibility at Junctions* (1:1000).

  This drawing illustrates details of proposed visibility at the following junctions:

  - L12044/R313 Junction.
  - L12044/L1204 Junction.
  - L1204/R313/Bord na Mona Junction.
  - Bellanaboy Terminal Access/R314 Junction.
  - L1204/R314 Junction.

- Dwg. No. 2044-1021 *Details of Proposed Traffic Management* (NTS)

  This drawing illustrates details of proposed traffic management at the following junctions:

  - L12044/R313 Junction.
  - L12044/Local Access.
  - L12044/L1204 Junction.
  - L1204/R313/Bord na Mona Junction.
  - Bellanaboy Terminal Access/R314 Junction.
  - L1204/R314 Junction.

- Dwg. No. 2044-1022 *Details of Proposed Turning Movements Articulated Truck* (1:500).

  This drawing illustrates details of proposed turning movements for articulated trucks at the following junctions:

  - L12044/R313 Junction.
  - L12044/Local Access.
  - L12044/L1204 Junction.

It is considered that these drawings provide the information sought by the Board in relation to the junctions cited. Detailed discussions with the Roads Department of Mayo County Council indicated that the various works to the roads can be undertaken without the requirement to acquire third party lands.

Precise Duties of the Traffic Director and Flagmen at the above Junctions

Trained Traffic Directors, under the control of the Transport Operations' Manager, will perform the control of traffic at junctions. Following consultation with Area Superintendent (Mr Tony McNamara attached to the Gardaí at Belmullet), it has been agreed that these personnel should be described as "Traffic Directors", rather than "Flagmen". They will be equipped to be in full radio contact with the Transport Operation's Manager, and they will receive specialised training in the control of traffic at their assigned junction (Ref. *Transport Management Plan* Section 5.4.16, response to Item 1 of the Further Information Request, Mayo County Council P03/3343).

The proposed one-way operation on the L1204, R313, and L12044 is intended to apply to all traffic (both construction and non-construction related) using the L1204 for the duration of the materials haulage period.

There will be signage encouraging the use of the L5284 as an alternative route during this period for those road users not resident along the L1204 and its branch roads.

The intended operation of the one-way system near the R313 junction was explained during the Open Days referenced above. There was an expressed willingness by residents, and by the school bus operator, to operate within an all-traffic one-way regime, in this manner, in the interests of safety and clarity. This approach is also preferred by the Gardaí (Area Superintendent Mr Tony McNamara) to any mixed one- and two-way system for different classes of vehicle.

The anticipated manner of control at each junction will be as follows:

- L1204/R313 Junction

  This is the junction of the haul route with the R313 road from Bangor to Belmullet, and it is also the junction with the access road to the Deposition Site.

  The Traffic Directors at this location will be responsible for directing the:

  - Laden vehicles from the L1204 across the R313 road and into the access road to the Deposition Site; and
  - Unladen vehicles onto the R313 towards Belmullet, where they will steer into a right turning lane marked with road markings, awaiting direction by his colleague at that junction as required below.

  While HGV's are crossing the R313, the Traffic Directors will pause traffic travelling towards Bangor, and traffic travelling the opposite direction toward Belmullet.

The proposed pause locations will permit clear turning circles for all HGV manoeuvres at this junction. Sight lines at this junction are sufficient to permit the proposed signage to regulate traffic out of working hours.

- R313/L12044 Junction

  Unladen HGV's about to turn right onto the L12044, and non-construction related traffic intending to travel north on the L1204, will stand in a central right-turning lane, delineated by road markings, before being directed by the Traffic Director across the east carriageway of the R313 road onto the L12044. Traffic heading east along the R313 will be required to pause by the Traffic Director while this crossing manoeuvre takes place.

  Traffic heading to Belmullet will be permitted to proceed under local speed control along the delineated left lane for this purpose. Sight lines at this junction are sufficient to permit the proposed signage to regulate traffic out of working hours.

  In order to minimise disruption to non-construction traffic on the R313, the Traffic Directors at the two junctions on the R313 will coordinate their actions. Laden vehicles entering the deposition site from the L 1204 and unladen vehicles turning right from the turning lane on the R313 onto the L12044 will be directed to move in the same cycle.

  In that way, it is an objective that drivers required to pause for construction traffic to cross at the R313/L12044 junction, will not later be asked to pause a second time at the R313/L1204 junction. This coordination would be a local objective, but subject to the Transport Operations' Manager's overview of the entire position from the GPS information at his disposal.

- R314-Terminal Access Road

  The Traffic Directors controlling traffic leaving the access road to the Terminal Site will pause traffic on the R314 to permit laden vehicles to emerge, cross the R314 eastbound lane, and head toward the L1204 junction.

  Construction traffic from the Deposition Site will enter the Terminal Site along the newly constructed slip road to the Terminal.

- R314-L1204 Junction

  The Traffic Director regulating this junction will direct unladen traffic from the L1204 across to the eastbound lane of the R314, by pausing non-construction traffic on the R314 at this junction. HGVs from the Terminal Site will turn directly onto the L1204 as they arrive at the junction.

Due to the encouragement afforded to road users heading to Bangor to use the alternative route L5284, it is expected that volumes of eastbound traffic on the R314 wishing to turn onto the L1204 will be small.

It is intended that a yellow box will be painted opposite the junction with the L5244 to permit occasional non-construction traffic emerging from this road to enter the westbound flow on the R314. It is considered that regulation of such traffic would fall within the control of the R314/L1204 junction Traffic Directors. Sight lines at this junction are sufficient to permit the proposed signage to regulate traffic out of working hours.

- L12044/L1204 Junction

  As explained above, it is intended that within the L1204-R313-L12044 one-way loop, all traffic will abide by the one-way discipline.

  Accordingly, unladen peat haulage HGVs and laden HGVs carrying other materials from Bangor toward the Terminal Site, will use the L12044 from the R313 as described above, and will then pause at the L12044/L1204 junction before being cleared by the Traffic Director at that junction to turn left onto the L1204 northbound.

  It is intended that a Traffic Director will control southbound traffic approaching this junction, as the available sight distances do not permit emergence of HGVs onto the L1204 without pause control of traffic in the other direction. Out-of-working-hours control at this junction will be scaled back to traffic light regulation, to ensure safe movement of traffic in the restricted sight distances near this junction, as shown on Dwg. No. 2044/1021.

- Other Junctions

  The proposal for unmanned traffic control junctions is to erect statutory signage and project specific signage as illustrated on Dwg. No. 2044-1003 in the Traffic Management Plan that was provided in response to Mayo County Council's Request for Further Information.

  In addition to these statutory and project specific signs, additional temporary advisory signs will also be erected on the side roads that lead onto the L1204 and L12044 to advise road users of the nature of the proposed haulage activities.

(See also Item 2.1.10 below.)

2.1.3 Item 2

The Board requested the following:

2. *'Submit details of how haulage vehicle breakdowns would be handled, and how slower-moving HGV's including road sweepers are to be passed on both the proposed Haul Route and the return route. Please state if lay-bys are proposed and, if so, submit details of these including location.'*

2.1.4 Response to Item 2

The *Transport Management Plan* (Section 5.5) indicates that a Recovery Vehicle will be permanently based on site to recover any breakdown vehicles. The broken-down vehicle, if part of the haulage fleet, will immediately report the occurrence and the nearest chainage marker to the Transport Operations' Manager, who will dispatch the Recovery Crew to the location, simultaneously warning other drivers of the hazard.

Broken-down vehicles outside the haulage fleet will be reported by the Fleet Drivers as part of their obligations under the Code of Practice for Drivers. In addition to this, an information sign at each end of the L1204 will advise details of recovery vehicle contact numbers. The Transport Operations' Manager will then dispatch stand-by Traffic Directors to regulate traffic around the obstruction, while the recovery vehicle is hooking up.

The Transport Operations' Manager will simultaneously decide whether or not to scale down the haulage operation to prevent unplanned queues forming at the breakdown site. In other respects, the Contractor will operate a Maintenance Yard for repair of breakdowns as set out in Section 5.4.13 of the *Transport Management Plan*.

The *Transport Management Plan* at Section 5.4.15 envisages that road sweeping is done continuously on the access roads to the Deposition and Terminal Sites (2 No. Road Sweepers).

On the main haul route it is done primarily as an evening activity outside of haulage hours (pg. 22), so that HGVs hauling materials are not required to pass a slower-moving sweeper under normal circumstances. It is emphasized that each of the access roads to the Deposition and Terminal Sites will be paved and each site will have a wheel wash. Field trials by Bórd na Móna carried out in February 2004, and reported in the response to the Request for Further Information to Mayo County Council, show that the proposed windrowing period is sufficient to permit free water to drain, so that the trial runs of peat haulage did not result in free water spillage onto the roads.

If twice-daily sweeping was required on the haul route in particular circumstances, then the sweeper would be directed to the area requiring attention during the 13.20hrs-14.00 hrs period when a large portion of the HGV fleet would be expected to be on a break period. The Plan also commits to control payload size so that there is generous freeboard between the sides and tailgate and the payload, minimising the risk of loss of material over the sides of the vehicle; the option to cover the trucks in transit with a tarpaulin cover is also available.

Nonetheless, the Plan envisages that, should this happen, a system is in place to report it via the Driver's in-cabin communications system, and at that point the Road-Sweeping Crew would be assigned to the precise location to recover the spilled material. The Transport Operations' Manager, in appraising the position of the lost material, would warn other drivers of the recovery operation, and to exercise due caution at that location.

Normal overtaking precautions would follow if, in the Transport Operations' Manager's view, the location permits safe sight distances. Otherwise the Transport Operations' Manager would assign a Traffic Director to regulate flow around the recovery operation, or direct HGVs to stand-to in safe passing areas, with curtailment of the filling operation at the Terminal Site, until normal traffic flow conditions had resumed.

As indicated in the *Transport Management Plan* (Section 5.4.8, pg. 26) designated lay-bys are not proposed as such, but the L1204 road will be widened to a minimum width of 5.5m over its whole length, with the exception of the area within the proposed one-way system. Notwithstanding the above, and where the width between fences permits, the road will be widened to more than 5.5m, and will be further widened locally, up to the maximum available width, to effectively form a lay-by at those locations where these conditions permit.

2.1.5 Item 3

The Board requested the following:

3. *'Submit details of the proposed regulation of the one-way system with particular reference to non-haulage traffic on the L12044. In particular, reference should be made to the housing cluster access junction and provision for passing on the section of the road approaching the R313 where the carriageway width is less than 4.0 metres. Please state if the proposed one-way system is intended to apply to all traffic or to be restricted to haulage traffic related to the proposed development.'*

2.1.6 Response to Item 3

As outlined above, it is intended that all traffic would abide by the one-way system in the area referenced; accordingly passing on the restricted width section approaching the R313 would not arise. Non-haulage as well as haulage traffic on the L12044 would follow the same instructions, provided by the Traffic Director and the regulatory signs at the R313/L12044 junction, at the four-way junction serving the house cluster and at the L12044/L1204 junction.

At the housing cluster access referred to, non-haulage traffic would pause before moving into the one-way stream along the L12044, and being regulated thereafter by the Traffic Directors and the regulatory signage as set out above.

2.1.7 Item 4

The Board requested the following:

4. *'Submit details of the proposed regulation of the one-way system with particular reference to non-haulage traffic on the L1204. It is noted that the effective carriageway on this stretch narrows to approx. 4.8 metres in places, and that the road is used by haulage vehicles associated with other industries e.g. forestry, and also occasional buses. Please state how it is proposed that large vehicles would pass on this stretch of road.'*

2.1.8 Response to Item 4

Non-haulage traffic on the L1204 will be required to operate the one-way system along with haulage traffic, on the southern section of this road, as illustrated on Dwg. No. 2044/1023.

Forests along the L1204 and its environs are at different stages of maturity. Extensive harvesting over the past 18 months near Glenturk has now effectively come to an end, with other forests in this area largely at an immature stage. The Coillte Manager for the area (Mr Seamus O'Connor) expects to harvest 3,000 tonnes of timber, which is a total of 150 loads, over July/Aug 2005.

Forestry-related loads are consequently low in frequency, and it is intended that the Transport Operations' Manager would maintain liaison with the forestry operators to coordinate movement of timber along the L1204 with haulage traffic. Coillte (Mr Seamus O'Connor) agrees that it is practical to arrange timber load movements opportunistically to avoid the busiest period of peat transport, and that there is flexibility in the July-August harvesting period from their viewpoint. There may be windows of time during which weather conditions prohibit the movement of peat, and there would be no impact on forestry HGV movement at such times.

All housing clusters in the villages along, and adjacent to, the proposed haul route, the R313, R314, L1204 and L12044 have been surveyed with respect to residents' travel patterns, including school children and old age pensioners, in order to assess and understand any general and special requirements. Discussions with the school bus operator in the area have established that they would have no difficulty operating the one-way discipline on the R313-L12044-L1204 section of the haul route, where passing would not be involved.

The school bus service for national school children operates a minibus vehicle, while that for secondary school children is a full size bus, which currently traverses the L1204 with quarry HGV traffic, with adequate passing clearance even before widening. The timing and route of all of these buses, including a Rehab minibus that links with the public service from Bangor to Belmullet have been determined.

Drivers of haulage vehicles will be under standing-instruction to give way to such vehicles following on at the nearest safe pull-in point, and they will be under instruction not to overtake a school bus loading or disembarking children (Ref. A15, A16 Drivers' Code of Practice, Appendix 2 *Transport Management Plan*). Elsewhere it is proposed to make available a minibus service for the use of residents along the L1204 during the haulage periods each day, and this will run within the HGV traffic stream on the route.

In other respects, non-haulage traffic on the L1204 approaching the R313 junction would be subject to the same traffic regulation from the Traffic Director there, as are the HGVs.

2.1.9 Item 5

The Board requested the following:

5. *'Submit clarification of Drawing No. 2044-1011 included in the Traffic Management Plan. It is noted that the plan drawing and the section do not appear to correspond in relation to the section of road leading into the junction between the L1204 and R313 indicated as "widening on both sides by grading back existing ridge".'*

2.1.10 Response to Item 5

Drawing No. 2044/1011 was originally prepared before the prospect of a one-way system at that end of the L1204 was secured. The drawing has been updated (Rev. A) to show "*widening on both sides by grading back existing edge*" on both sides for the full length of the one-way section of the L1204, without land acquisition, but in the knowledge that it is not expected that a minimum width of 5.5m will be achieved in this one-way section. Two additional cross sections have been detailed on Dwg. No. 2044-1018, which now correspond directly to the Plan information on Dwg. No.2044/1011 Rev. A.

2.2 Phosphorous

2.2.1 Item 6

The Board requested the following:

6 *'(a) How were the sampling points selected?*

(b) How were the samples taken and subdivided?

(c) Was each peat sample a single discrete sample or a composite of a number of sub-samples?'

2.2.3 Response to Item 6

Response to Item 6 (a)

As outlined in Table P4 of the Preamble of Volume 1 of the EIS, a concern had been raised during the consultation process for the *Environmental Impact Statement* for the terminal site, that phosphate, which had been applied at the site, might be re-mobilised as a result of construction activities to be undertaken at the site. The Applicant therefore undertook a baseline survey of nutrient concentrations. This work included studies of phosphate concentrations in surface waters, groundwater and peat. (See Sections 9.1 and 9.2.4 of Volume 1 of the EIS, and the responses to Item 6 and Item 8 of the Further Information Request from Mayo County Council.)

The sampling programme was undertaken for the previous planning application and appeal. In addition to the terminal footprint, it covered a large area to the east of the proposed terminal footprint, where it had been proposed to store the excavated peat.

The terminal footprint of the current application is 13ha of which approximately 11ha will be excavated. The previous application's terminal footprint was in approximately the same place as the current application but larger (17ha). Some of the areas highlighted as elevated are now outside of the proposed zone of excavation.

The results of this survey are discussed in Section 8 of Volume 1 of the EIS, and the results acquired from the analysis of the shallow peat samples were summarised in the response to Item 6 of the Further Information Request (Mayo County Council P03/3343) in the form of contour plots. It was decided to include the results from outside of the footprint to present a more complete picture of the status of phosphate levels on the site.

The discussion in the response to Item 6, however, concentrates on the results from the sampling of the terminal footprint only, as this zone represents the material that will be excavated and re-deposited (hence providing a possible source of nutrient loading).

These plots showed where in the two depth intervals (0 to 15 cm and 15 to 30 cm below the peat surface) elevated concentrations of phosphate had been encountered.

A sampling density of one sample point per hectare was selected to provide an extensive and systematic survey of the site. Seventeen sample location points were identified. For each of these, a stratified sampling approach was completed, with two intervals being sampled. These were 0.0 - 0.15m and 0.15 - 0.30m. The purpose of this stratified sampling strategy was to characterise accurately and efficiently the acrotelm concentration depth profile.

As outlined in the response to the Request for Further Information to Mayo County Council (Item 6), the focus of the study was to assess the potential for the loss of phosphorous from soil to water and it was considered that the zone within the peat profile where most phosphorous was thought to remain, and hence be available for leaching, would be the acrotelm.

Response to Item 6 (b)

The methodology used for monitoring point location and sampling involved the following:

- A clino-compass and 100m engineering tape was used for navigation and siting of sample point locations. A "site plan" basemap with sample points was used as the navigation platform.

- Due to the shallow nature of the sampling, a spade was used to carefully extract a 0.1m (W) x 0.1m (L) x 0.15m (D) (interval 1) peat sod from the bog surface. A slicing sampler knife was then used to half the sod along the depth profile and isolate a continuous sample string from the centre of the sod extracted. This ensures *in situ* isolation and non-contamination of the sample by intrusive activity. This procedure was repeated for interval 2 (0.15-0.30m).

- Test laboratory (Alscontrol Geochem) pre-prepared 500mg/l amber jars were labelled, filled and stored in cool-bags during the fieldwork operation. At the earliest convenience, sample jars were offloaded, cross-checked for ID reference on Chain of Custody forms, cleaned and wrapped up carefully for long-term storage and transport in cool-boxes.

- Sampling equipment was washed down using de-ionised water in between sample points to ensure non-cross-contamination of samples.

- At each sample point location, the positional reference was recorded using a Magellan 315/320 GPS handset. This was crosschecked with proposed site sampling plan (basemap) to ensure that the field operation followed the proposed plan.

Response to Item 6 (c)

As described in the response to item 6 (b) the sample was a single discrete sample taken through the depth interval being sampled and not a composite of sub-samples.

2.2.4 Item 7

The Board requested the following:

7 *'What is the basis for the statement that the UKAS Accredited Method "allows the determination of leachable orthophosphate"?'*

2.2.5 Response to Item 7

In preparation for the baseline survey, an assessment was made of the most suitable methods that would adequately give a measure of the potential for phosphorous loss from the soil to water on the site.

The factors that influenced the selection of test method included:

- Peat has a very high water content;
- The potential for phosphorous loss from dry matter was considered to be low, taking into account the sediment containment measures proposed;
- The potential phosphorous loss through leaching was considered to be more significant; and
- The Applicant had a strong preference for using accredited methods of testing.

Given the above, it was decided to use Molybdate Reactive Phosphate (MRP) testing of leachate extracted from the peat sample. The two tests used were:

- (UK) National Rivers Authority (NRA) Leaching Test (standard prep. test for leachability of chemicals from soil) (method statement attached Appendix 2.1).
- Vanadomolydbophoshoric Acid Colorimetric Method (UKAS accredited) (method statement attached Appendix 2.2).

The MRP concentrations as measured are 'broadly equivalent to orthophosphate'[1].

2.2.6 Item 8

The Board requested the following:

8 *'What is regarded as the cut-off point between an environmentally acceptable concentration of orthophosphate and an environmentally unacceptable level?'*

[1] (EPA: Parameters of Water Quality – Interpretation and Standards, 2001.)

2.2.7 Response to Item 8

The Applicant's understanding of this question is that the Board is seeking to determine what concentration was applied as a 'cut-off' level of leachable orthophosphate in peat in the interpretation of the phosphate sampling results and subsequent discussion as presented in the response to Item 6 of the Further Information Request (Mayo County Council Ref. P03/3343).

The phosphate on the site has been there for some time, from when the site was used for agricultural and forestry purposes. However, there is no record of any application of fertiliser to the site during the last five growing seasons. The baseline information dates from 2002, and there is a possibility that the phosphate concentration has reduced somewhat in the course of the last two years. The concerns addressed by the Applicant in the EIS deals with the possibility that some phosphate, which is currently in the peat, is mobilised through the excavation process and thereby causes an increase in the phosphate levels in the run-off from the site.

In the interpretation of the phosphate sampling results and subsequent discussion as presented in the EIS and the response to Item 6 of the Further Information Request (Mayo County Council Ref. P03/3343), the Applicant did not distinguish between an environmentally acceptable concentration of orthophosphate and an environmentally unacceptable level. The approach taken by the Applicant was to distinguish between a 'background' level and an 'elevated' level. This is further clarified below in relation to phosphate levels in soil (peat) and run-off water from the site.

Soil

As explained in the EIS, the site has been used since the 1950s for agricultural and forestry purposes. Thus it was considered that it would be appropriate to make reference to agricultural soils in the determination of background and elevated levels in soils.

The Teagasc Farm Nutrient Profile[2], reproduced below, states that for grassland and silage areas where the soil P level concentration is between 1.2 – 6 mg/l, P is considered to be 'at maintenance + top-up levels'. A soil P level of greater than 10 is considered to be one above which no further application is necessary i.e. an upper bound. While this profile relates specifically to growth of grass, the implication is that Teagasc regards 10 mg/l as an environmentally acceptable level for soil in agricultural use.

In discussions with Teagasc (pers. Comm)[3], the Applicant has also understood that for mineral soils, 2-3mg/l is typical while values greater than 15mg/l are considered problematic.

[2] Teagasc Farm Nutrient Profile: Reference Information for Professionals. Phil Rogers, Tom Gately [deceased] & Tom Keating.

[3] This information was obtained from Teagasc representatives, Johnstown Castle Research, Co. Wexford in February 2002 by Mr Cecil Shine, Minerex, the Applicant's hydrological and hydrogeological adviser.

The analytical method used for agricultural assessment of phosphorus concentration available to plant uptake in mineral soils is known as Morgan's 'P'. This is a soil sample extract digestion method. An ~80% correlation between orthophosphate in water and Morgans 'P' value is quoted for peat (Martin McGarrigle, EPA – per comm.) with concentrations arising from Morgan's P analysis being ~20% greater than that for orthophosphate.

Soil P Index	Soil P (mg/L, or ppm)	Guideline to applications of phosphate fertiliser needed	Response likely
1	0-3	P at build-up levels	High
2	3.1-6	P at maintenance + top up levels	Medium
3	6.1-10	P at maintenance level only for grazing area	Low
		No P needed for silage area if slurry applied	
4	>10	No P needed**	None

(Source: Teagasc. See Footnote 2, above.)

In the area of the terminal footprint, the samples collected in the 0 to 15 cm interval in areas that are shown to be outside of the blue / red contour plots, have results in the range 0 – 8 mg/litre (see detailed results listed in the attached table Appendix 2.3). In the 15 – 30 cm interval, the plots are drawn for sampling points where the results exceeded 9 mg/l. As referenced in the response (Item 6), deeper peat samples had shown levels in the range up to 5 mg/l. In this context, the cut-off level was 8-9 mg/l, which is consistent with the Teagasc grading.

Water

Unlike mineral soils, orthophosphate is weakly sorbed by peat due to the absence of iron, aluminium, calcium and magnesium ions / complexes which chemically bind phosphate. Clay minerals in particular assist in binding and retarding phosphate mobility. Taking these factors into account, there is theoretically the potential for orthophosphate concentrations found on site to constitute a risk to adjacent and surrounding surface water bodies.

SI No. 258 (1998), Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorous) Regulations, 1988 (the Phosphorus Regulations) states a maximum admissible concentration of 0.02 to 0.05mg/l PO_4 for lake water and 0.05 to 0.07mg/l PO_4 for river water.

Results obtained from some small areas of the terminal site are up to five magnitudes greater than these limits. These results are obtained from "leachate" water analysis and thus are not directly representative of groundwater.

While the relationship between these concentrations and groundwater values has not been proven, the orthophosphate concentration values recorded are elevated.

However, the results of extensive water sampling from the site drains, local streams and larger watercourses show that there is no evidence that orthophosphate is being leached into these waters in any significant quantities (reference is made to the response to Item 8 of the Request for Further Information (Mayo County Council Ref. P03/3343). This could be due to a number of factors including: the potential for high dilution of the leachable phosphate by the waters passing through the more permeable upper section of the peat where the largest concentrations occur; the lower residence times of the water passing through this section of the peat; and also the age of the phosphate source, which being in excess of 5 years, has probably lost most, if not all, of the easily leachable portion.

Furthermore, as stated in the EIS sections 2, 3 and 9, the site drainage design incorporates a perimeter drain system that feeds into a pair of settlement ponds. These ponds include for the provision of iron mesh to encourage the precipitation of any phosphate in solution as well as the collection of suspended solids that might have phosphate bonded to them. Furthermore, downstream of the settlement ponds, all water leaving the ponds will pass over a rip-rap mattress and over a riparian vegetated area, before ultimately being discharged to offsite watercourses. These further mitigation measures will assist in the precipitation and uptake of water-soluble phosphates.

The drainage system captures all surface water run off from the Terminal site. This system captures all surface runoff from the site from construction through operation to decommissioning and will minimise the risk of potential release of any elevated concentrations of phosphate either in solution or bonded to sediment particles.

The Applicant is committed to the implementation of the mitigation measures outlined above, and further detailed in the EIS. This will include extensive field monitoring of ground and surface water quality, in accordance with the requirements of Northwestern Regional Fisheries Board, the Salmon Research Section of the Marine Institute and Mayo County Council.

2.2.8 Item 9

The Board requested the following:

9 *'Are the values given for orthophosphate concentration (mg/l) based on wet or dry volumes of peat?'*

2.2.9 Response to Item 9

The values are based on wet volumes of peat because the test used does not dry the peat from its natural state.

3.0 CONCLUSION

We trust that the above response addresses fully the issues raised by the Board in its letter of 27 August 2004, namely in respect of Roads and Transportation, and Phosphorous, respectively.

As stated in the introductory Section 1.2 above, the Applicant and Project Team are anxious to ensure that a correct interpretation of the questions has been made. In this regard, we would be happy to clarify any issue arising if considered appropriate by An Bord Pleanála.

Yours faithfully

Tom Phillips
Managing Director
Tom Phillips + Associates

Encl.

(**Appendix 1** is set out in a bound A4 folder that includes the drawings and complementary CD disk cited above in the Introduction.)

Appendix 2.1

Alcontrol Laboratories Land Division

Brief Method Statement

NRA Leaching Test

1. Soil samples are tested as received, with no drying or crushing.

2. A moisture content is performed prior to the leach test, so results can be corrected back to a dry weight basis, if required.

3. A quantity of soil is weighed into the extraction vessel, usually 100g.

4. One litre of de-ionised water (which is first allowed to equilibrate in air to a pH of approximately 6.5) is then added, and the sample gently, but continuously agitated for a period of 24 hours. (The agitation is not end over end, but side to side.)

5. The sample is then filtered, and the leachate tested for pH, EC and any other parameters as required.

6. To calculate the mass of a substance leached from the original sample:

$$\text{Mass mg/kg wet weight} = \frac{\text{conc in eluate (mg/l)} \times \text{volume of eluate (l)}}{\text{Original mass (kg)}}$$

Eg

$$= \frac{10 \text{ mg/l} \times 1}{0.1}$$

$$= 100 \text{ mg/kg}$$

(An easier method is to multiply the result in mg/l by 10.)

This result would then be corrected using the moisture content if results are required as mg/kg dry weight.

4500-P C. Vanadomolybdophosphoric Acid Colorimetric Method

1. General Discussion

a. Principle: In a dilute orthophosphate solution, ammonium molybdate reacts under acid conditions to form a heteropoly acid, molybdophosphoric acid. In the presence of vanadium, yellow vanadomolybdophosphoric acid is formed. The intensity of the yellow color is proportional to phosphate concentration.

b. Interference: Positive interference is caused by silica and arsenate only if the sample is heated. Negative interferences are caused by arsenate, fluoride, thorium, bismuth, sulfide, thiosulfate, thiocyanate, or excess molybdate. Blue color is caused by ferrous iron but this does not affect results if ferrous iron concentration is less than 100 mg/L. Sulfide interference may be removed by oxidation with bromine water. Ions that do not interfere in concentrations up to 1000 mg/L are Al^{3+}, Fe^{3+}, Mg^{2+}, Ca^{2+}, Ba^{2+}, Sr^{2+}, Li^{+}, Na^{+}, K^{+}, NH_4^{+}, Cd^{2+}, Mn^{2+}, Pb^{2+}, Hg^{+}, Hg^{2+}, Sn^{2+}, Cu^{2+}, Ni^{2+}, Ag^{+}, U^{6+}, Zr^{4+}, AsO_3^{-}, Br^{-}, CO_3^{2-}, ClO_3^{-}, CN^{-}, IO_3^{-}, SiO_3^{2-}, NO_3^{-}, NO_2^{-}, SO_4^{2-}, SO_3^{2-}, pyrophosphate, molybdate, tetraborate, selenate, benzoate, citrate, oxalate, lactate, tartrate, formate, and salicylate. If HNO_3 is used in the test, Cl^{-} interferes at 75 mg/L.

c. Minimum detectable concentration: The minimum detectable concentration is 200 µg P/L in 1-cm spectrophotometer cells.

2. Apparatus

a. Colorimetric equipment: One of the following is required:

1) *Spectrophotometer,* for use at 400 to 490 nm.

2) *Filter photometer,* provided with a blue or violet filter exhibiting maximum transmittance between 400 and 470 nm.

The wavelength at which color intensity is measured depends on sensitivity desired, because sensitivity varies tenfold with wavelengths 400 to 490 nm. Ferric iron causes interference at low wavelengths, particularly at 400 nm. A wavelength of 470 nm usually is used. Concentration ranges for different wavelengths are:

P Range mg/L	Wavelength nm
1.0–5.0	400
2.0–10	420
4.0–18	470

b. Acid-washed glassware: Use acid-washed glassware for determining low concentrations of phosphorus. Phosphate contamination is common because of its absorption on glass surfaces. Avoid using commercial detergents containing phosphate. Clean all glassware with hot dilute HCl and rinse well with distilled water. Preferably, reserve the glassware only for phosphate determination, and after use, wash and keep filled with water until needed. If this is done, acid treatment is required only occasionally.

c. Filtration apparatus and filter paper:[*]

3. Reagents

a. Phenolphthalein indicator aqueous solution.

b. Hydrochloric acid, HCl, 1 + 1. H_2SO_4, $HClO_4$, or HNO_3 may be substituted for HCl. The acid concentration in the determination is not critical but a final sample concentration of 0.5*N* is recommended.

c. Activated carbon.[†] Remove fine particles by rinsing with distilled water.

d. Vanadate-molybdate reagent:

1) *Solution A:* Dissolve 25 g ammonium molybdate, $(NH_4)_6Mo_7O_{24}\cdot 4H_2O$, in 300 mL distilled water.

2) *Solution B:* Dissolve 1.25 g ammonium metavanadate, NH_4VO_3, by heating to boiling in 300 mL distilled water. Cool and add 330 mL conc HCl. Cool Solution B to room temperature, pour Solution A into Solution B, mix, and dilute to 1 L.

e. Standard phosphate solution: Dissolve in distilled water 219.5 mg anhydrous KH_2PO_4 and dilute to 1000 mL; 1.00 mL = 50.0 µg PO_4^{3-}-P.

4. Procedure

a. Sample pH adjustment: If sample pH is greater than 10, add 0.05 mL (1 drop) phenolphthalein indicator to 50.0 mL sample and discharge the red color with 1 + 1 HCl before diluting to 100 mL.

b. Color removal from sample: Remove excessive color in sample by shaking about 50 mL with 200 mg activated carbon in an erlenmeyer flask for 5 min and filter to remove carbon. Check each batch of carbon for phosphate because some batches produce high reagent blanks.

c. Color development in sample: Place 35 mL or less of sample, containing 0.05 to 1.0 mg P, in a 50-mL volumetric flask. Add 10 mL vanadate-molybdate reagent and dilute to the mark with distilled water. Prepare a blank in which 35 mL distilled water is substituted for the sample. After 10 min or more, measure absorbance of sample versus a blank at a wavelength of 400 to 490 nm, depending on sensitivity desired (see ¶ 2*a* above). The color is stable for days and its intensity is unaffected by variation in room temperature.

d. Preparation of calibration curve: Prepare a calibration curve by using suitable volumes of standard phosphate solution and proceeding as in ¶ 4*c*. When ferric ion is low enough not to interfere, plot a family of calibration curves of one series of standard solutions for various wavelengths. This permits a wide latitude of concentrations in one series of determinations. Analyze at least one standard with each set of samples.

5. Calculation

mg P/L = [illegible] mL sample

6. Precision and Bias

See Table 4500-P:I.

7. Bibliography

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[*] Whatman No. 42 or equivalent.

[†] Darco G60 or equivalent.

Appendix 2.3

Results of Orthophosphate Concentrations Measured on Terminal Site

Orthophosphate Concentrations measured on Terminal Site

Location number (as per Contour Map	Interval 0-15 cm Conc. (mg/l)	Interval 15-30 cm Conc. (mg/l)
8	25	2
9	219	3
10	4	3
11	2	4
12	1	2
13*		
14	3	2
15	49	2
16	2	3
17	3	1
18	25	3
19*		
20	51	31
21	38	3
22	36	3
23	3	3
24	24	9
25	24	10
26	8	14

* No results were recorded.

Corrib natural gas

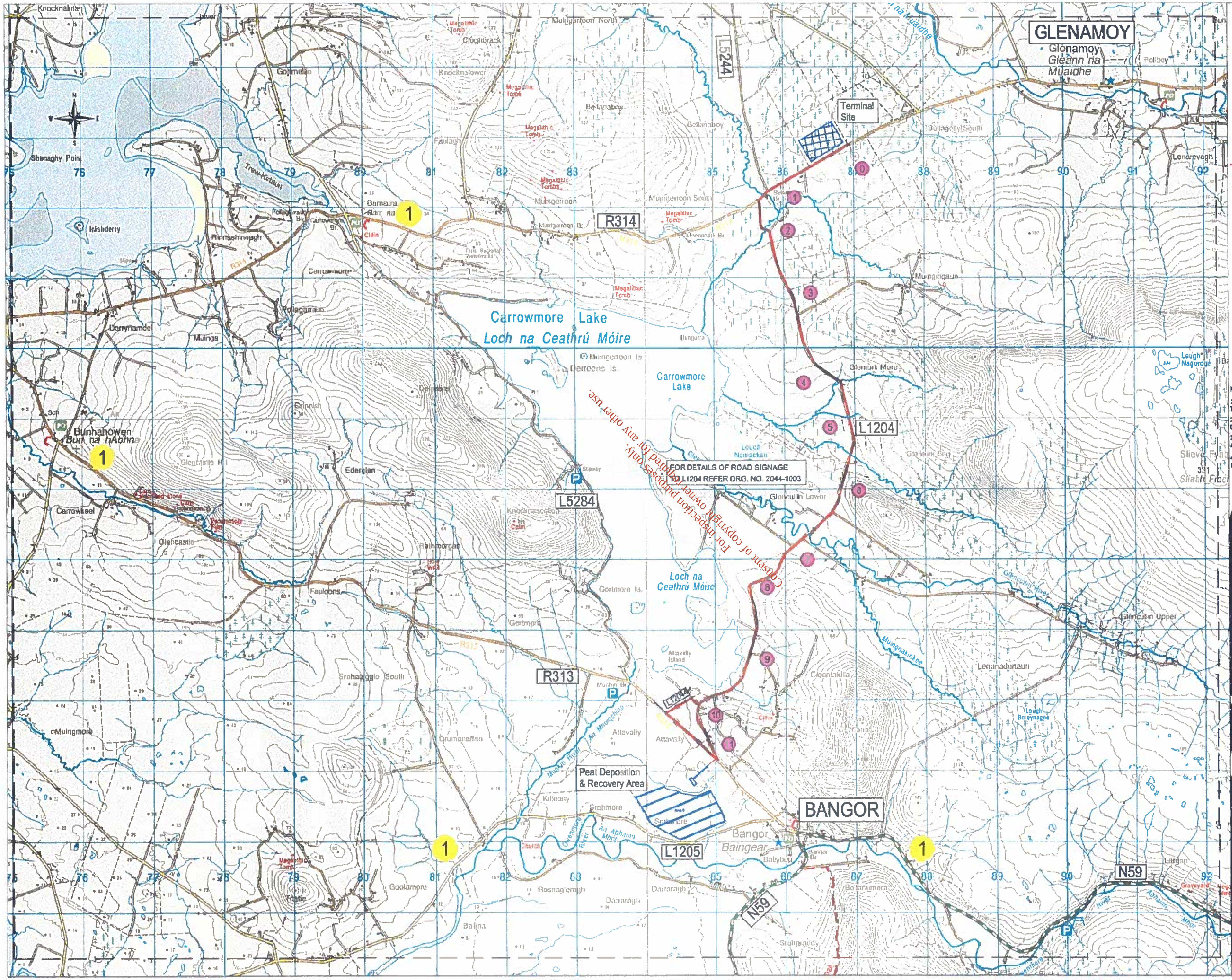
Shell E&P Ireland Ltd.

Response to items raised by An Bord Pleanala

TOBIN ROAD DRAWINGS

2044-1001A	Layout Plan showing terminal site, haul route and peat deposition site
2044-1002A	Key plan to layout plans
2044-1011A	Layout Plan and Longitudinal Section of Haul Road Sheet 7 of 7
2044-1012A	Layout Plan and Longitudinal Section of Return Route R313 and L12044
2044-1018	Additional typical cross sections for road types G1 and G2
2044-1019	Details of proposed turning movements
2044-1020	Details of proposed visibility at junctions
2044-1021	Details of proposed Traffic Management
2044-1022	Details of proposed turning movements Articulated Truck
2044-1023	Details of proposed one way loop at Shrahmore

Mayo County Council Reg Ref: P03/3343
An Bord Pleanala Ref: PL 16.207212



LEGEND

- 1 ROAD SIGN TYPE 1 (REF. APPENDIX NO.3)
- PROPOSED HAUL ROUTE (L1204)
- 4 KILOMETRE CHAINAGE POINTS
- R313 ROAD REFERENCE NUMBER

FOR DETAILS OF ROAD SIGNAGE TO L1204 REFER DRG. NO. 2044-1003

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev.	Date	Description	By	Chkd.
A	14 Aug 04	ADD CHAINAGE LOGO		

Client: Corrib

Project: **BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN**

Title: **LAYOUT PLAN SHOWING TERMINAL SITE, HAUL ROUTE AND PEAT DEPOSITION SITE**

Scale	1 : 25,000	
Prepared by: P.G.	Checked	Date OCT. '03
Project Director	M.F.GARRICK - CASTLEBAR	

TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. **2044-1001** Revision **A**

The location map is based on Ordnance Survey Map surveyed in the Early Twentieth Century. The Road Survey reflects an accurate survey using modern GPS Technology. This explains the slight discrepancy between the two alignments.

CANDIDATE SPECIAL AREA OF CONSERVATION

2044-1005

2044-1006

ROAD WIDENING TO THE EAST SIDE OF THE ROAD IN THIS AREA

2044-1007

SAG STOPS EAST SIDE OF FENCE ALONG ROAD

2044-1008

ROAD WIDENING TO THE EAST SIDE OF THE ROAD IN THIS AREA

AVOID WEST OF DRAIN ON WEST SIDE OF ROAD

2044-1009

PREFERRED SIDE FOR ROAD WIDENING TO THE EAST SIDE OF THE ROAD IN THIS AREA

2044-1010

2044-1011

NOTES

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Rev.	Date	Description	By	Ch
A	SEPT 04	ADJUST DRAWING TEE KINCK	CB	

Client: Corrib

Project: BELLANABOY BRIDGE TERNINAL TRANSPORT MANAGEMENT PLAN

Title: KEY PLAN TO LAYOUT PLANS

Scale: 1 : 15,000

Prepared by:	Checked	Date
P.G.		OCT. '03

Project Director: M.F.GARRICK - CASTLEBAR

TOBIN
Consulting, Civil and Structural Engineers.
Hynes Building, St. Augustine Street.
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. 2044-1002

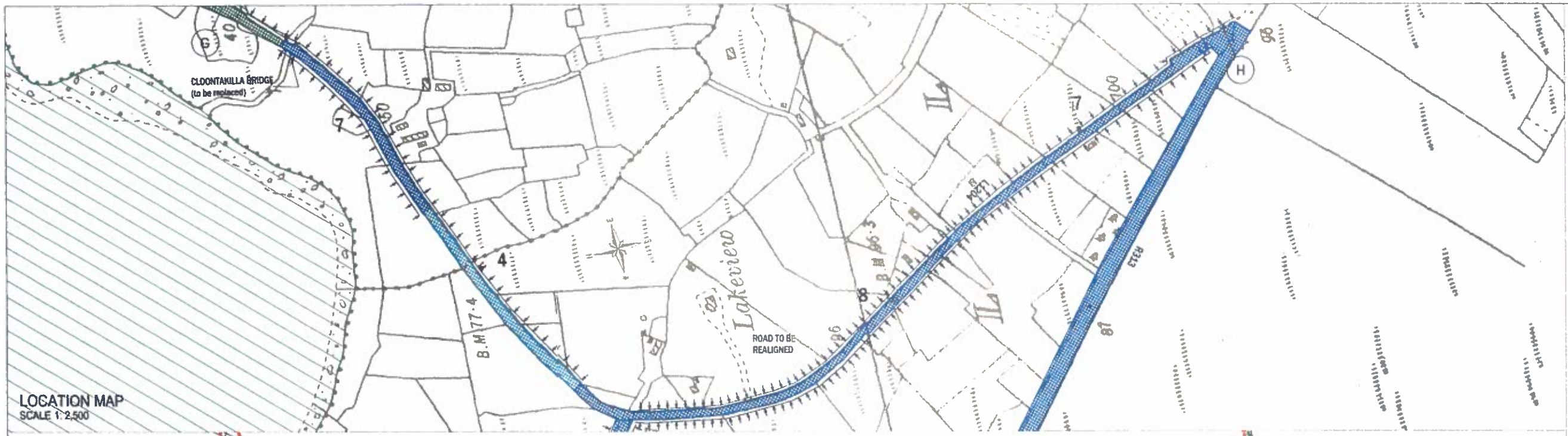
The location map is based on Ordnance Survey Map surveyed in the Early Twentieth Century. The Road Survey reflects an accurate survey using modern GPS Technology. This explains the slight discrepancy between the two alignments.

KEY

1. JUNCTION REALIGNMENT
2. OVERLAY ONLY
3. WIDENING ON ONE SIDE PLUS FILL TO EMBANKMENT
4. WIDENING ON ONE SIDE BY GRADING BACK EXISTING EDGE
5. SIGNIFICANT WIDENING WITHIN ROAD BOUNDARY
6. WIDENING ON ONE SIDE WITH DITCH REGRADING
7. WIDENING ON BOTH SIDES BY GRADING BACK EXISTING EDGE
8. ROAD REALIGNMENT
9. CANDIDATE SPECIAL AREA OF CONSERVATION

SIDE OF ROAD FOR PROPOSED WIDENING

LOCATION MAP
SCALE 1: 2,500



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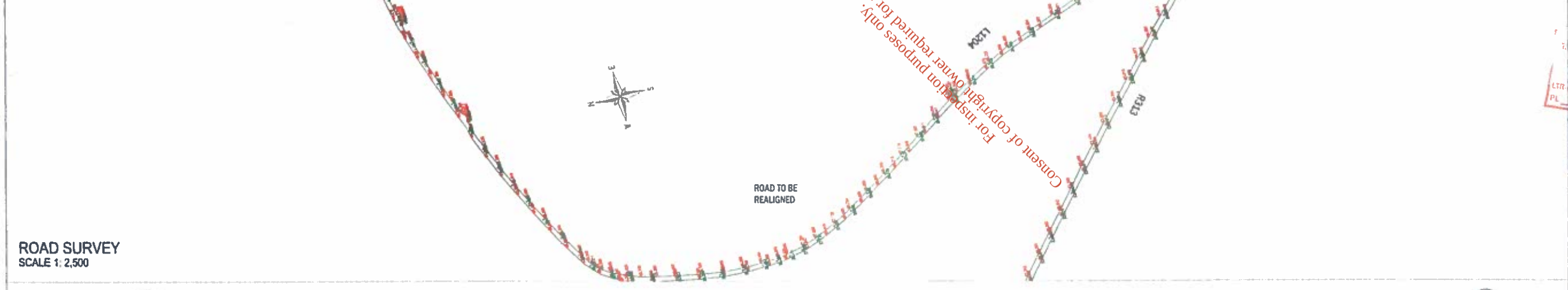
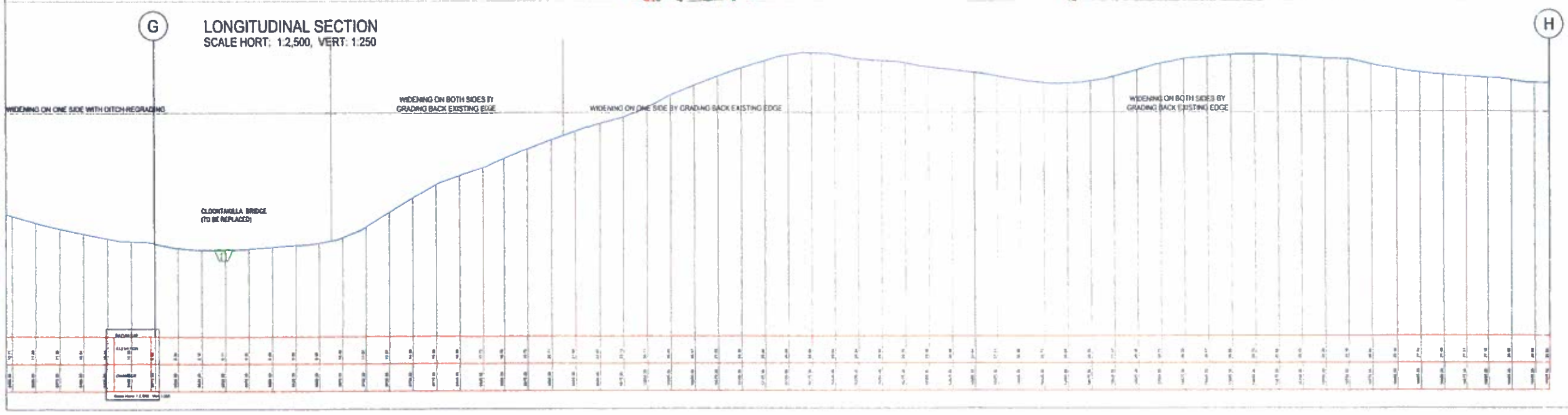


LONGITUDINAL SECTION
SCALE HORT: 1:2,500, VERT: 1:250



NOTES

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3. ENGINEER TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev.	Date	Description	By	Chkd.
A	SEPT 04	ROADWORKS DESCRIPTION CHANGED	PG	

Client: Corrib

Project: BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN

Title: LAYOUT PLAN & LONGITUDINAL SECTION OF HAUL ROAD SHEET 7 OF 7

Scale 1 : 2,500		HORIZ: 1 : 2,500 VERT: 1 : 250
Prepared by: P.G.	Checked	Date OCT. '03
Project Director	M.F.GARRICK - CASTLEBAR	

TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. 2044-1011 | Revision A

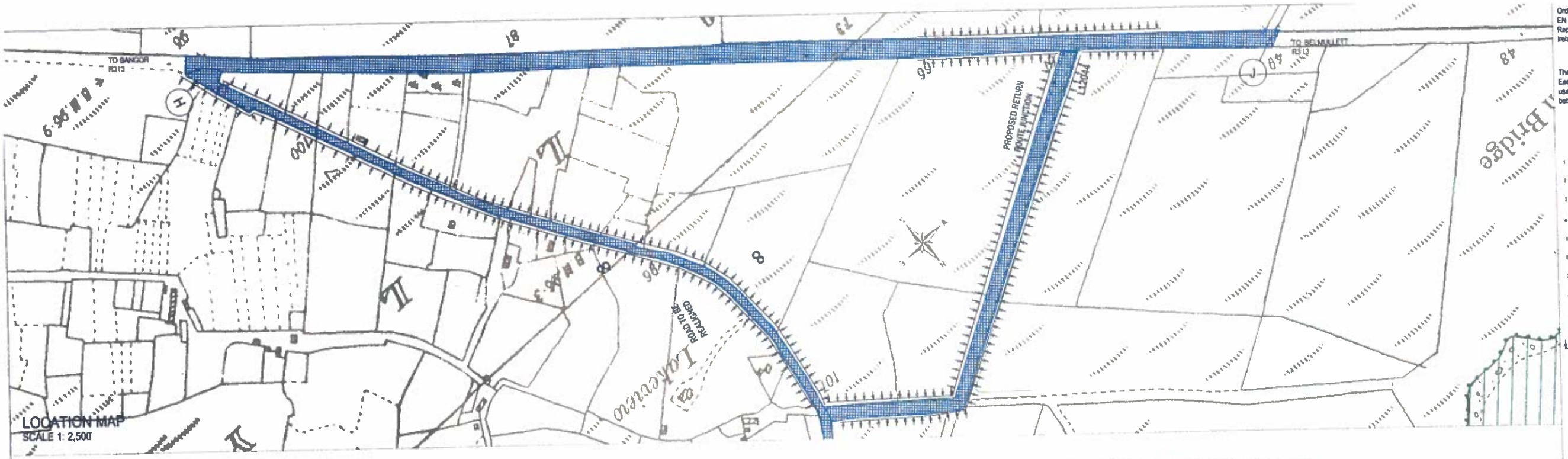
The location map is based on Ordnance Survey Map surveyed in the Early Twentieth Century. The Road Survey reflects an accurate survey using modern GPS Technology. This explains the slight discrepancy between the two alignments.

KEY

1. JUNCTION REALIGNMENT
2. OVERLAY ONLY
3. WIDENING ON ONE SIDE PLUS FILL TO EMBANKMENT
4. WIDENING ON ONE SIDE BY GRADING BACK EXISTING EDGE
5. SIGNIFICANT WIDENING WITHIN ROAD BOUNDARY
6. WIDENING ON ONE SIDE WITH DITCH REGRADING
7. WIDENING ON BOTH SIDES BY GRADING BACK EXISTING EDGE
8. ROAD REALIGNMENT
9. CANDIDATE SPECIAL AREA OF CONSERVATION

SIDE OF ROAD FOR PROPOSED WIDENING

LOCATION MAP
SCALE 1: 2,500



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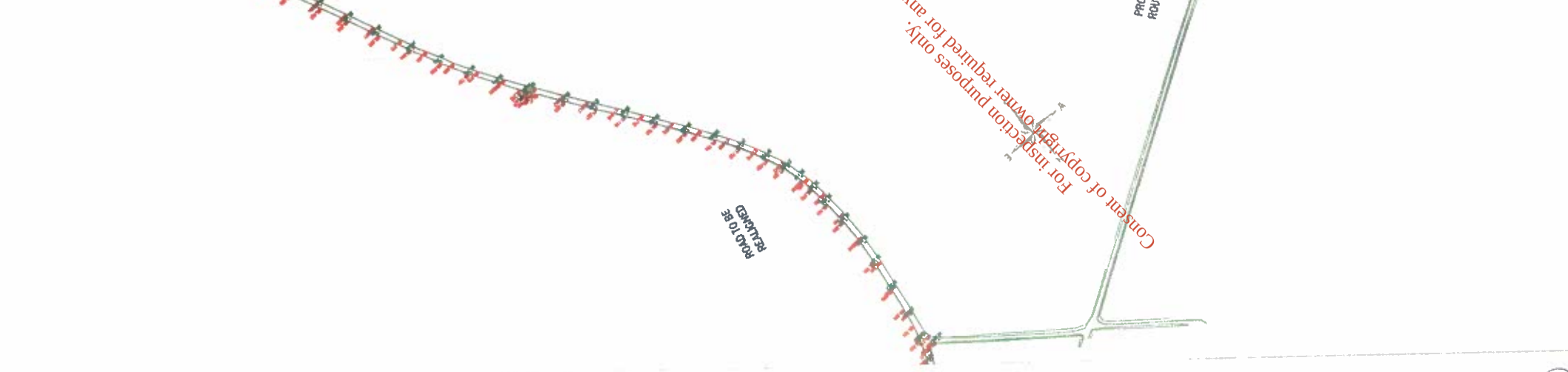
SCALE 1: 2,500



LONGITUDINAL SECTION
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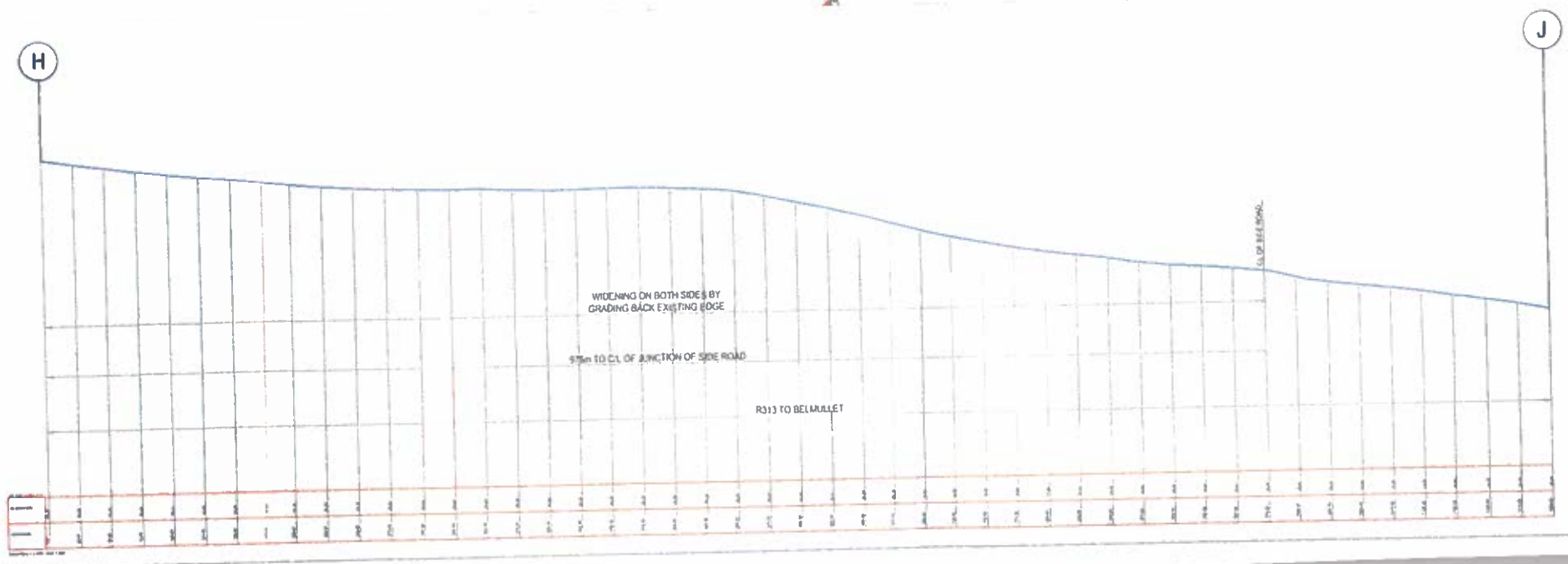

NOTES

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Rev.	Date	Description	By	Chkd.
A	SEPT-04	ROADWORKS DESCRIPTION CHANGED	PG	ED

Client: Corrib

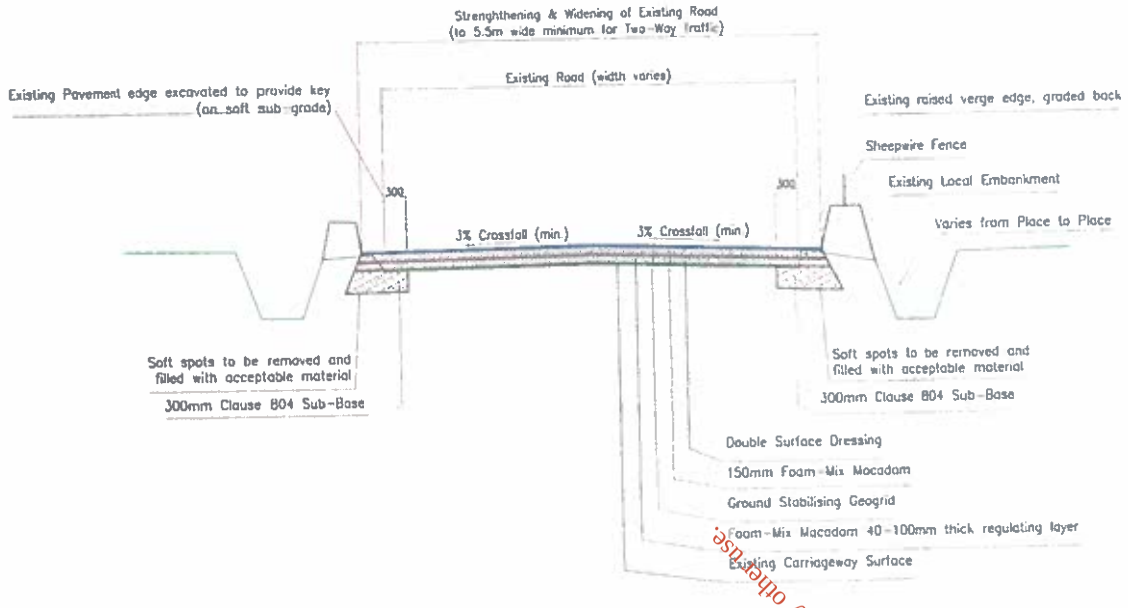
Project: BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN

Title: LAYOUT PLAN & LONGITUDINAL SECTION OF RETURN ROUTE R313 & L12044

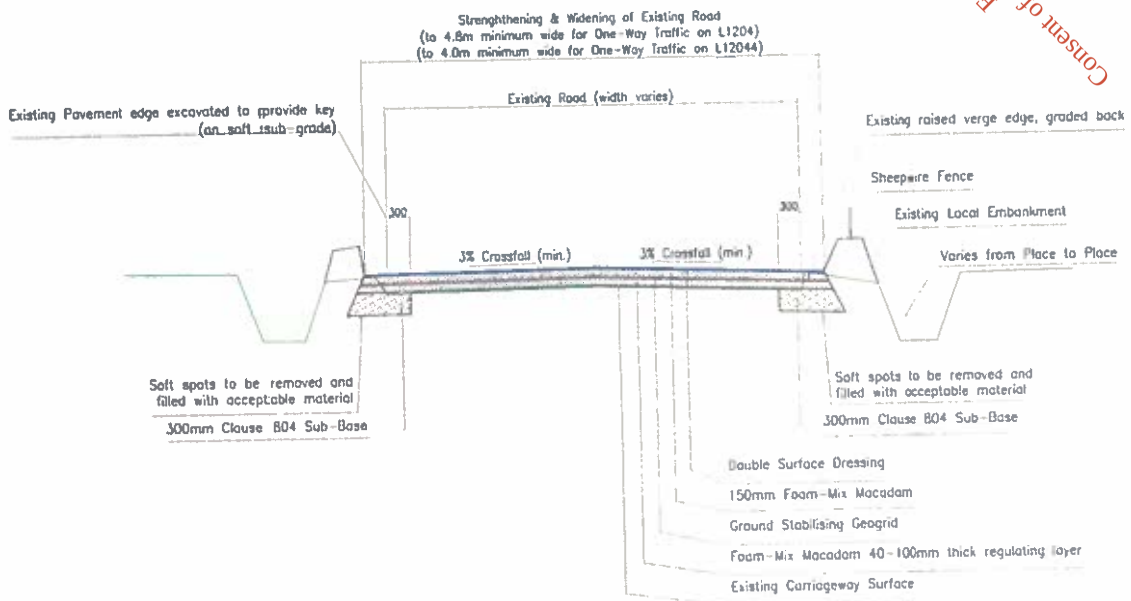
Scale	1 : 2,500	HORIZ: 1 : 2,500 VERT: 1 : 250
Prepared by: P.G.	Checked	Date JAN. '04
Project Director	M.F.GARRICK - CASTLEBAR	

TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. 2044-1012 | Revision A



G1-WIDENING ON BOTH SIDES BY GRADING BACK EXISTING EDGE FOR TWO-WAY TRAFFIC



G2-WIDENING ON BOTH SIDES BY GRADING BACK EXISTING EDGE FOR ONE WAY TRAFFIC

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4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev.	Date	Description	By	Chkd.

Client: Corrib

Project
BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN

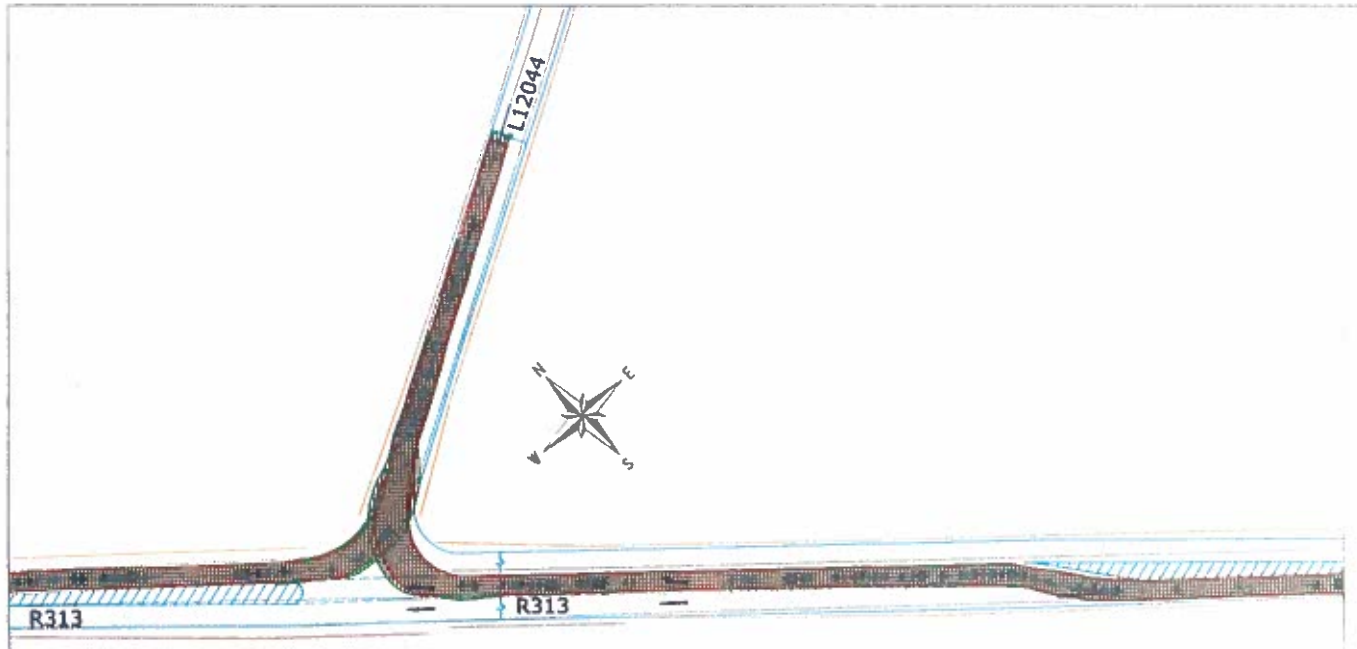
Title
ADDITIONAL TYPICAL CROSS SECTIONS FOR ROAD, TYPES G1 & G2

Scale	1:50	
Prepared by: P.G.	Checked E.D.	Date SEPT. '04
Project Director	M.F.GARRICK - CASTLEBAR	

TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. **2044-1018**

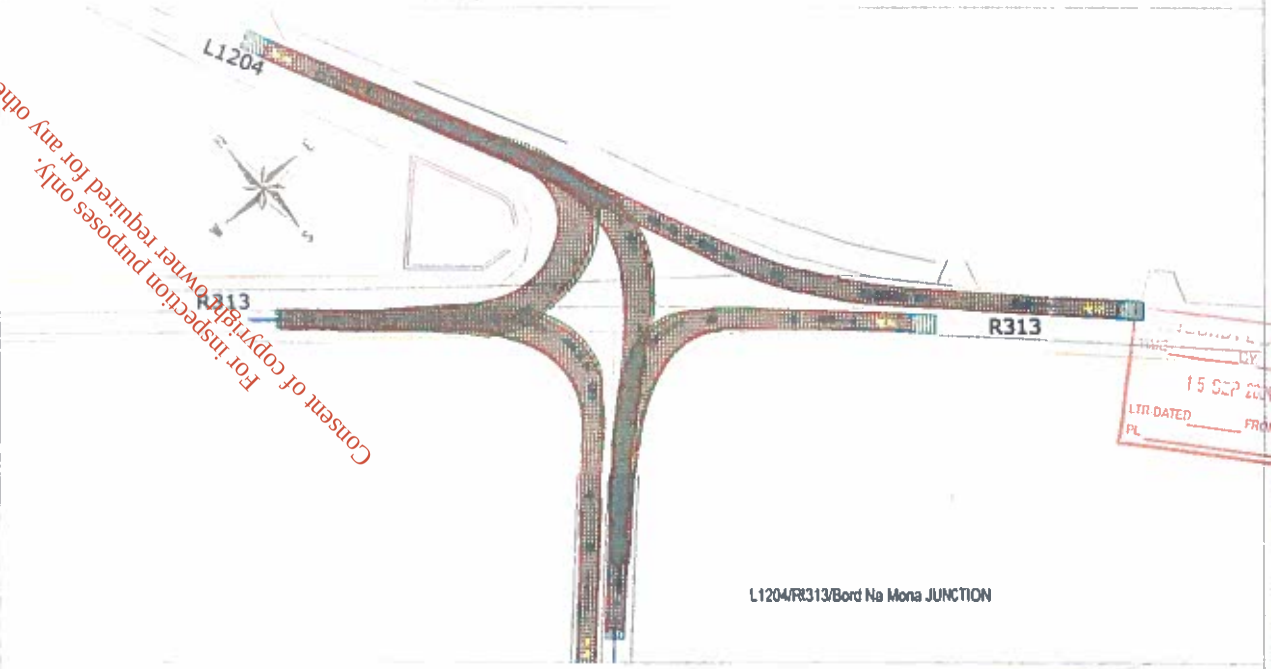
Revision -



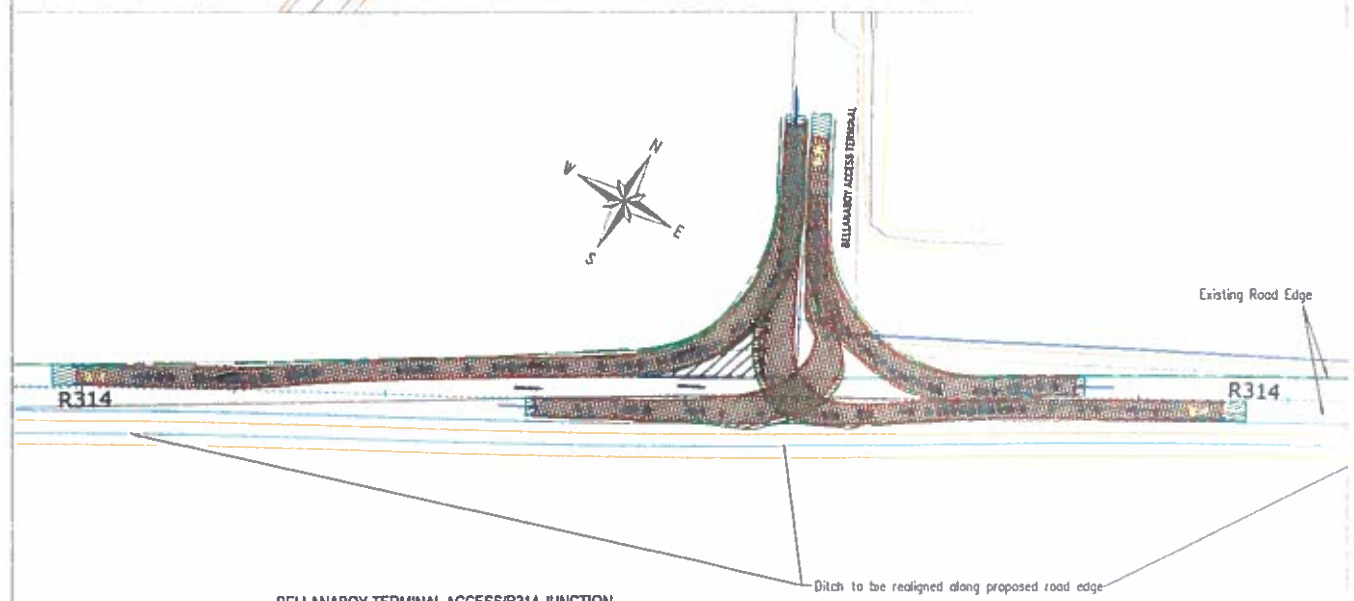
L12044/R313 JUNCTION

L12044/Local Access

Figure 2044-3 - L12044/L1204 JUNCTION



L1204/R313/Bord Na Mona JUNCTION



BELLANABOY TERMINAL ACCESS/R314 JUNCTION

L1204/R314 JUNCTION

Please refer to Drawing 2044-1001 and Drawing 2044-1020

TURNING MOVEMENTS FOR A RIGID TRUCK
RED LINE IS WHEELS, GREEN LINE IS OVERHANG

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev.	Date	Description	By	Chkd.

Client

Project

BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN

Title

DETAILS OF PROPOSED TURNING MOVEMENTS RIGID TRUCK

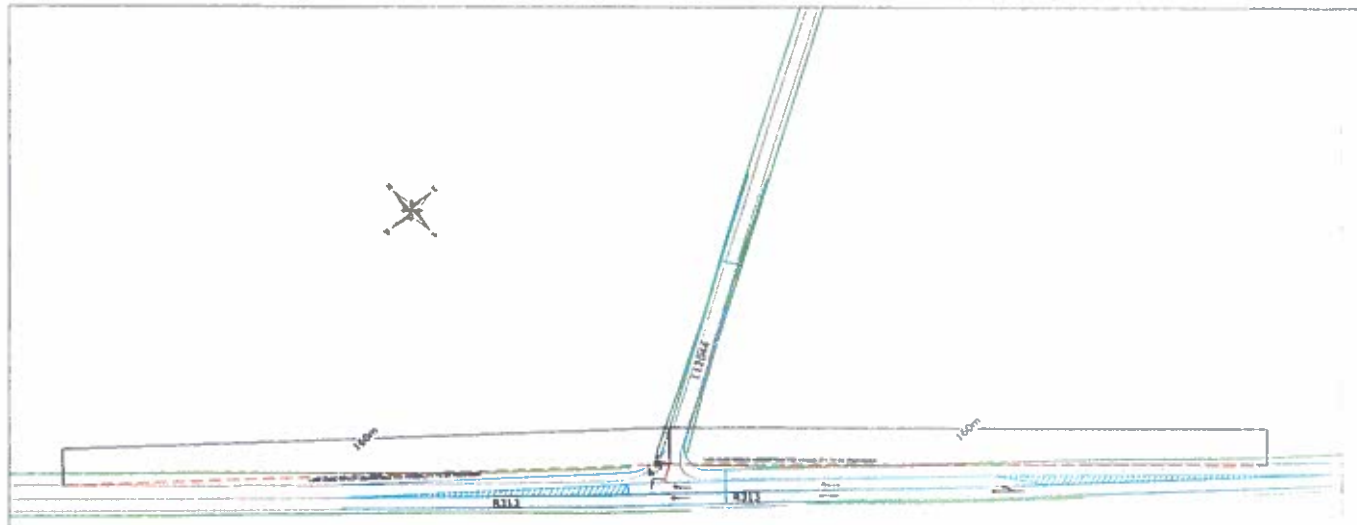
Scale 1/500		
Prepared by: ED	Checked	Date SEPT. '04
Project Director M.F.GARRICK - CASTLEBAR		

TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@ptobin.ie
www.ptobin.ie

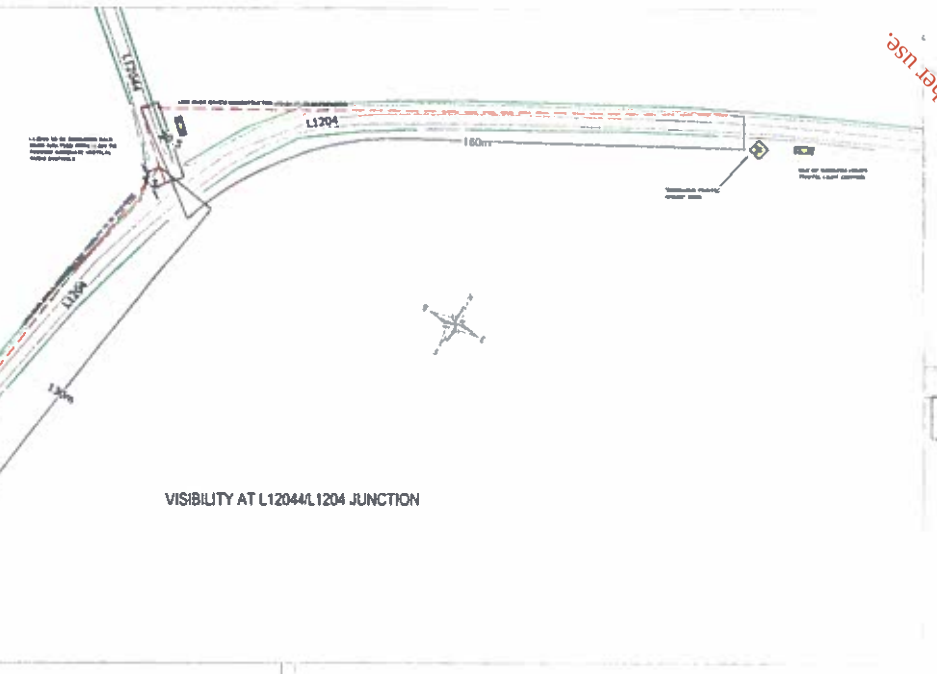
Drawing No. **2044-1019**

Revision -

SIGHT DISTANCE MEASURED AS PER NRA DMRB TD42/95 AND TD9/00



VISIBILITY AT L12044/R313 JUNCTION



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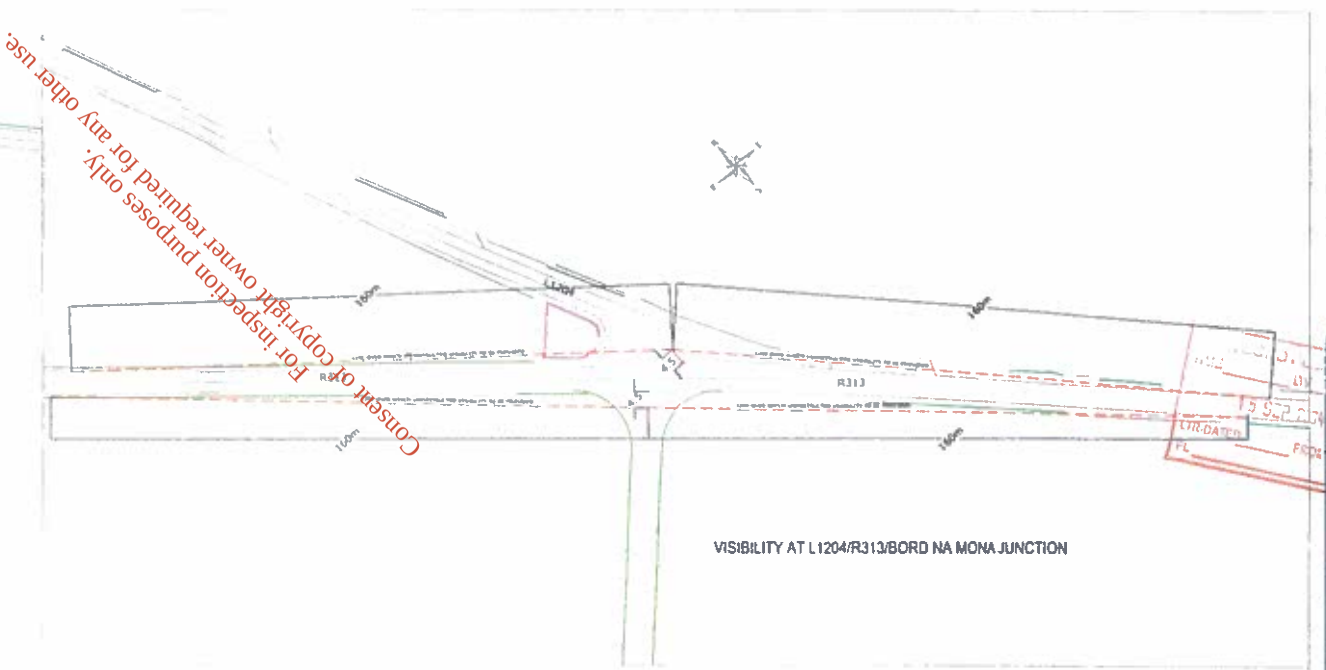
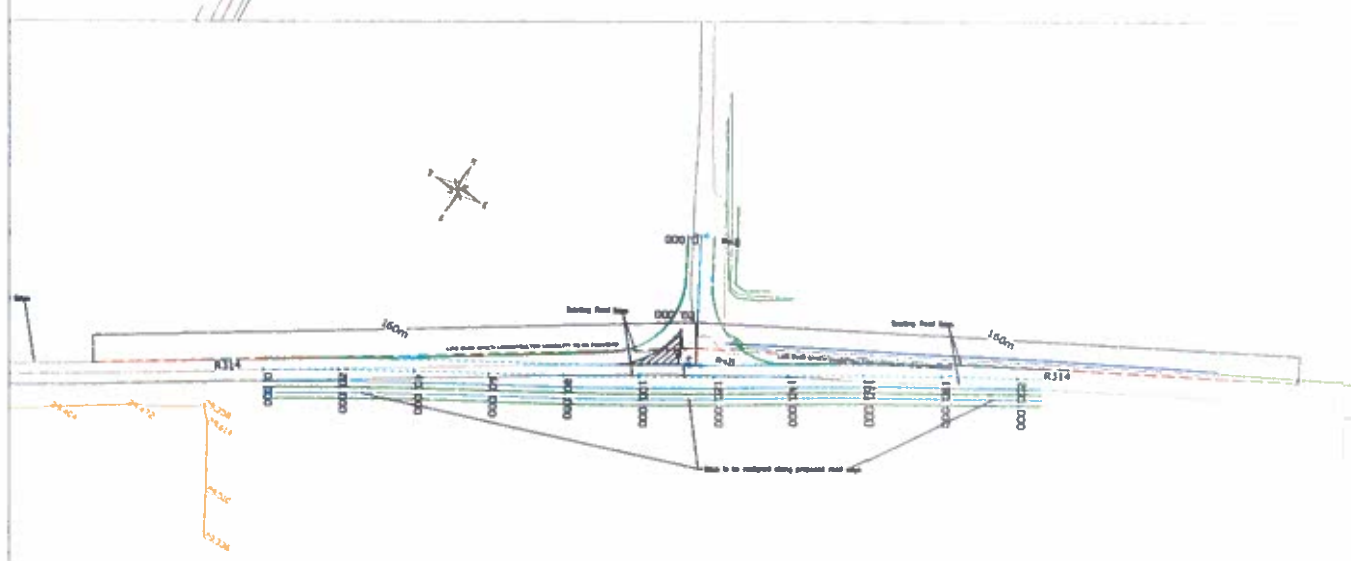
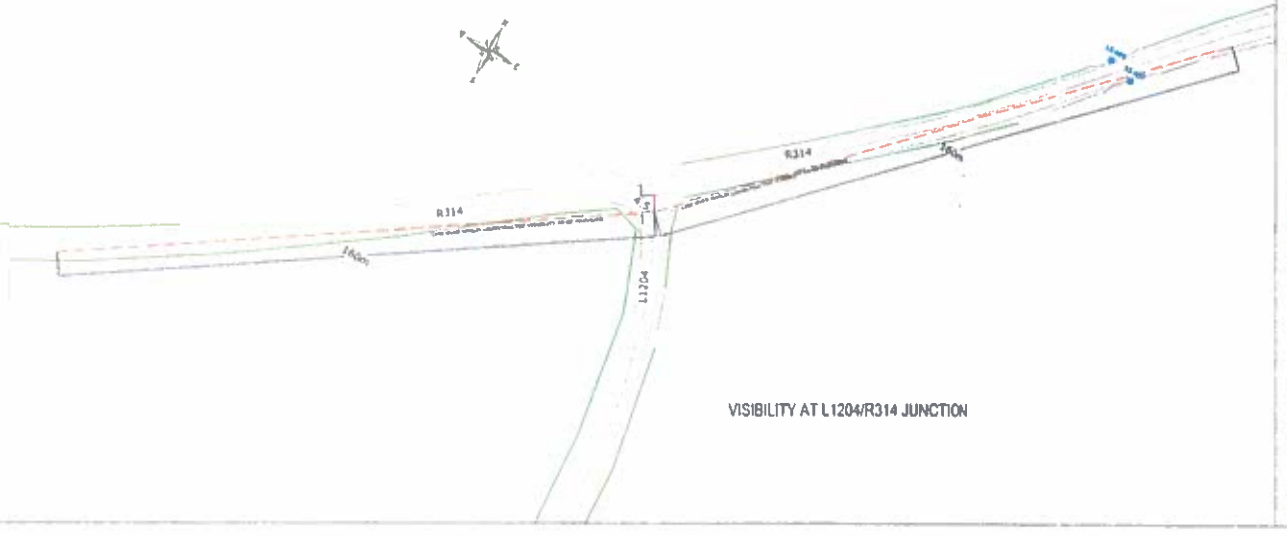


VISIBILITY AT L1204/R313/BORD NA MONA JUNCTION



VISIBILITY AT BELLANABOY TERMINAL ACCESS/R314 JUNCTION



VISIBILITY AT L1204/R314 JUNCTION

NOTES

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4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev.	Date	Description	By	Chkd.

Client

Project
BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN

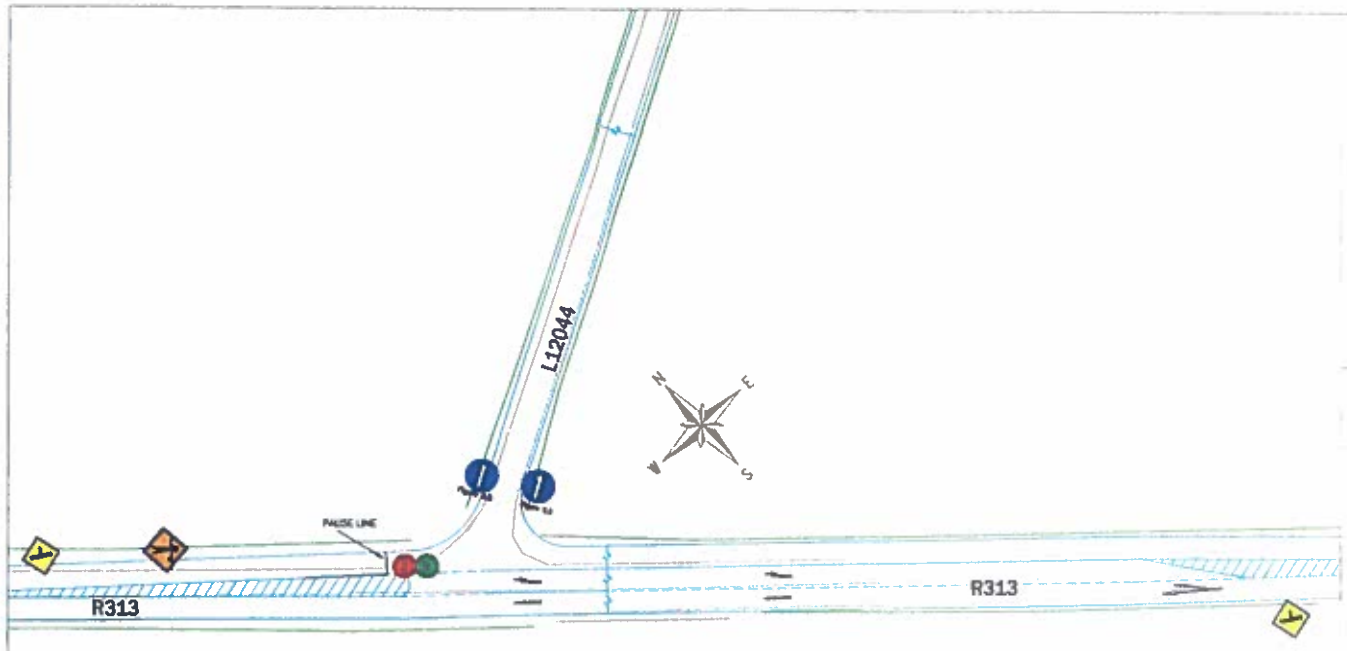
Title
DETAILS OF PROPOSED VISIBILITY AT JUNCTIONS

Scale 1 : 1000		
Prepared by: ED	Checked MG	Date SEPT. '04
Project Director M.F.GARRICK - CASTLEBAR		

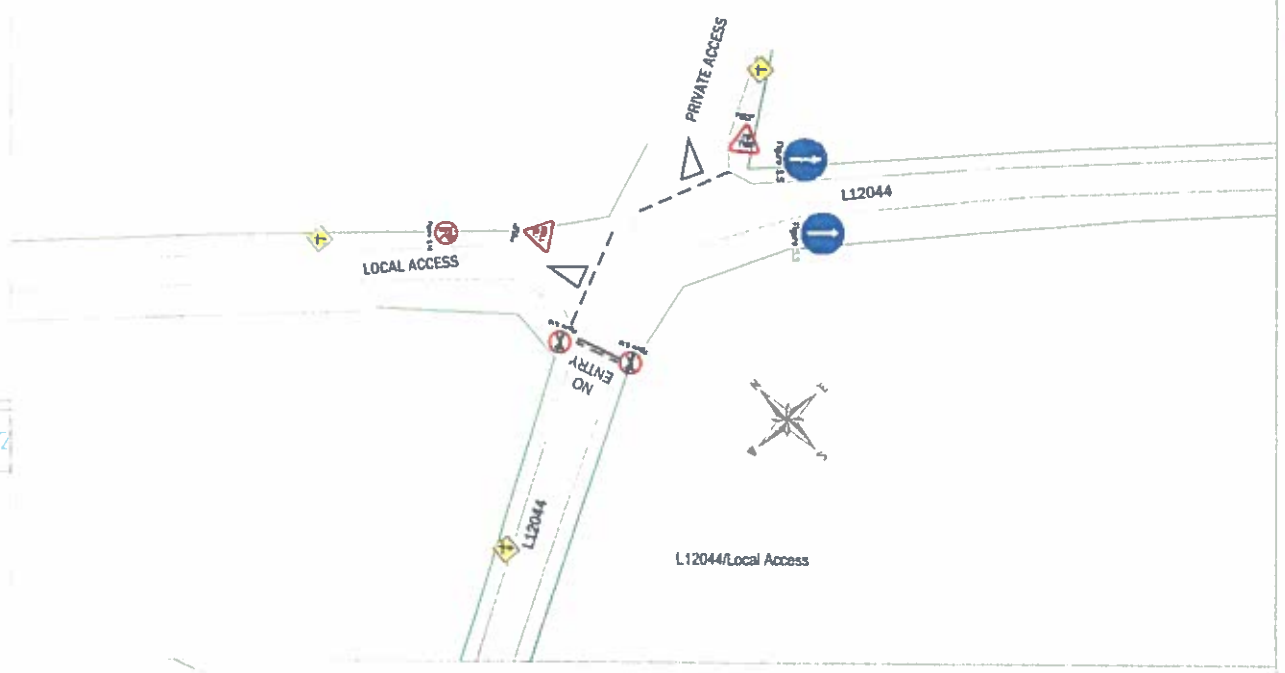
TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. **2044-1020**

Revision -



L12044/R313 JUNCTION



L12044/Local Access

SIGNS AND LINING TO BE IN ACCORDANCE WITH THE DEPARTMENT OF THE ENVIRONMENT TRAFFIC SIGNS MANUAL

REFER TO DRAWING NO. 2044-1003 FOR DETAILS OF SIGNAGE ALONG HAUL ROUTE

TRAFFIC DIRECTOR

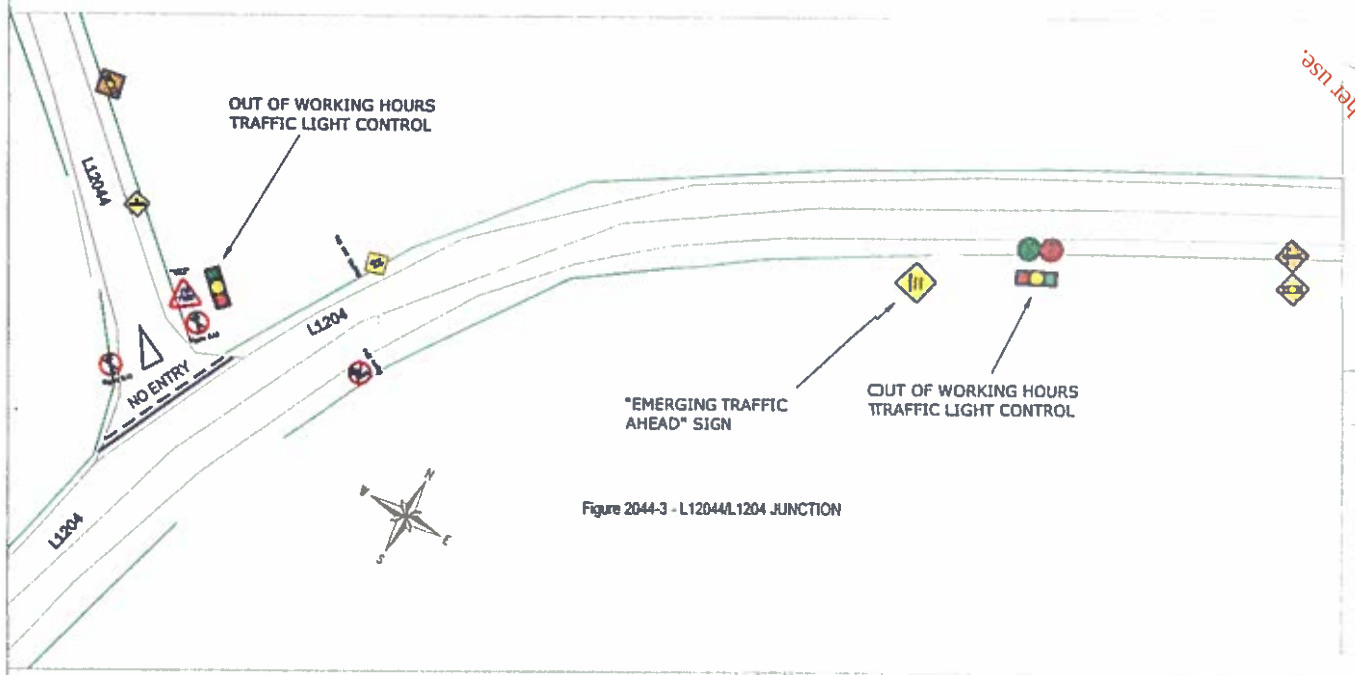
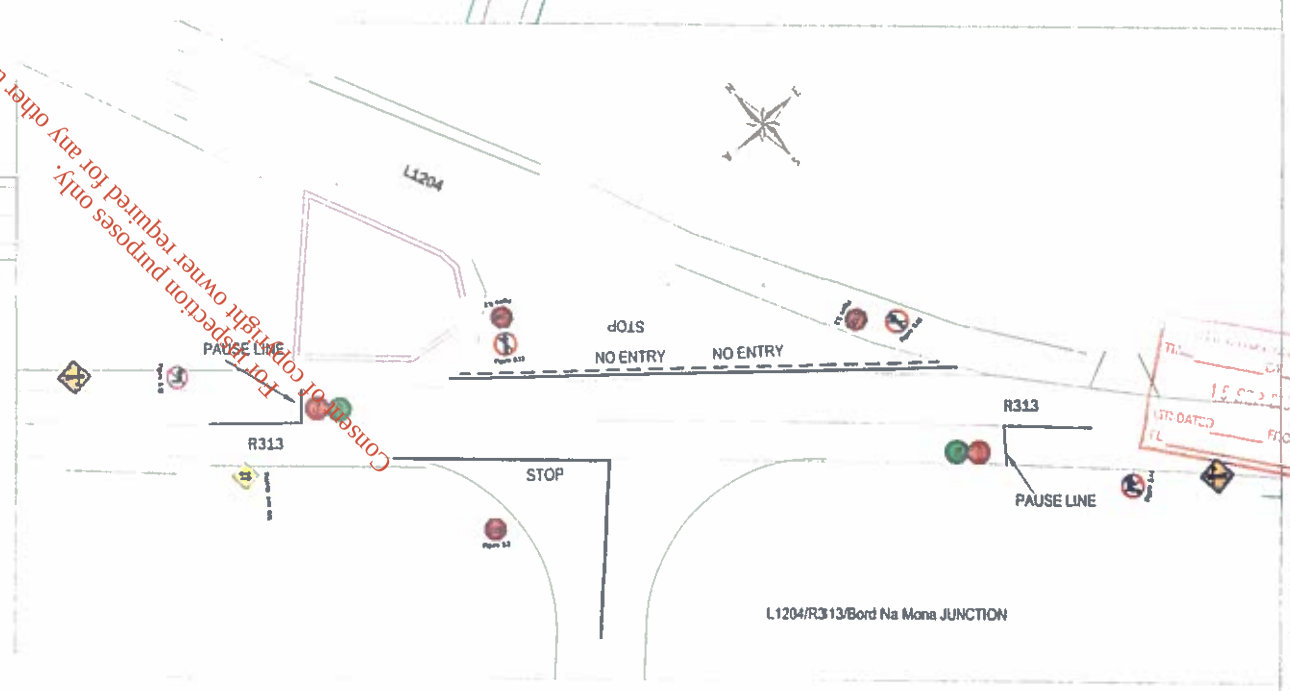
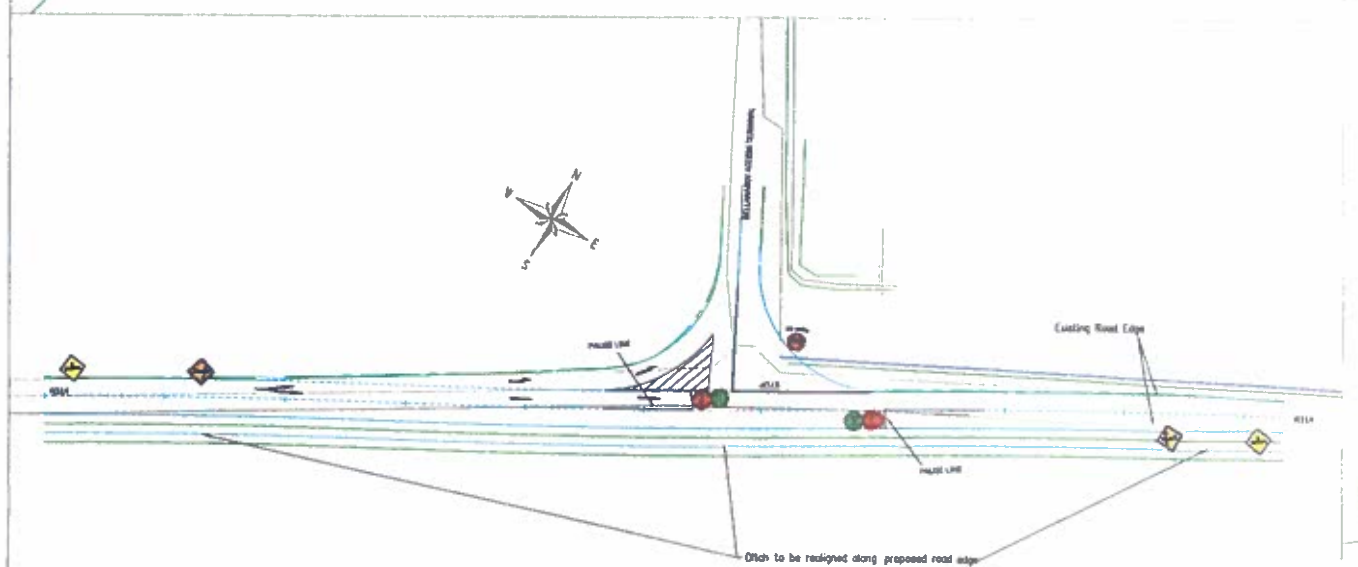


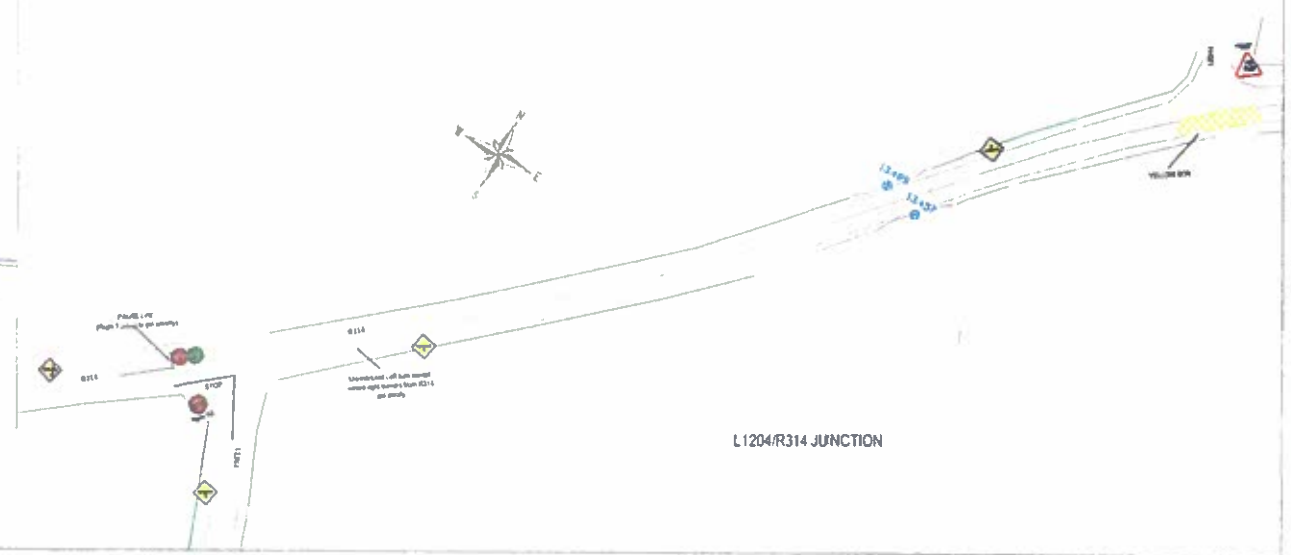
Figure 2044-3 - L12044/L1204 JUNCTION



L1204/R313/Bord Na Mona JUNCTION



BELLANABOY TERMINAL ACCESS/R314 JUNCTION



L1204/R314 JUNCTION

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Rev.	Date	Description	By	Chkd.

Client

Project
BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN

Title
DETAILS OF PROPOSED TRAFFIC MANAGEMENT

Scale	Not to Scale	
Prepared by: ED	Checked	Date SEPT. '04
Project Director	M.F.GARRICK - CASTLEBAR	

TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. **2044-1021**

Revision -

TURNING MOVEMENTS FOR ARTICULATED TRUCK
RED LINE IS WHEELS, GREEN LINE IS OVERHANG

L12044/R313 JUNCTION

L12044/Local Access

Figure 2044-3 - L12044/L1204 JUNCTION

NOTES

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Rev.	Date	Description	By	Chkd.

Client

Project
BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN

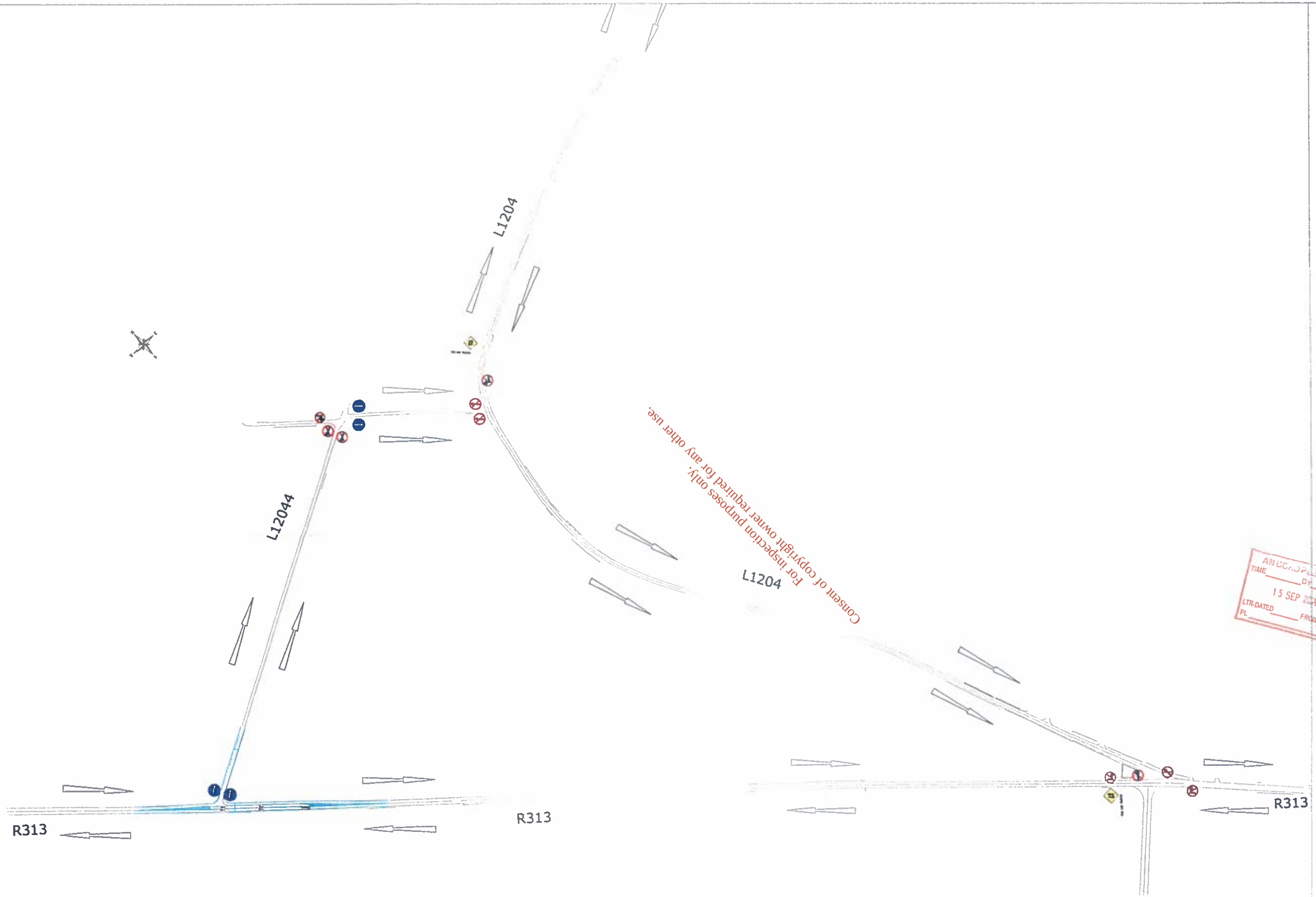
Title
DETAILS OF PROPOSED TURNING MOVEMENTS ARTICULATED TRUCK

Scale 1/500		
Prepared by: ED	Checked MG	Date SEPT. '04
Project Director M.F.GARRICK - CASTLEBAR		

TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. **2044-1022**

Revision -



ONE WAY TRAFFIC

TWO WAY TRAFFIC

NOTES

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Rev.	Date	Description	By	Chkd.

Client

Project

BELLANABOY BRIDGE TERMINAL TRANSPORT MANAGEMENT PLAN

Title

DETAILS OF PROPOSED ONE WAY LOOP AT SRAHMORE

Scale	1 : 2000	
Prepared by: ED	Checked	Date SEPT. '04
Project Director	M.F.GARRICK · CASTLEBAR	

TOBIN
Consulting, Civil and Structural Engineers,
Hynes Building, St. Augustine Street,
Galway, Ireland.
tel: +353-(0)91-565211
fax:+353-(0)91-565398
e-mail: info@pjtobin.ie
www.pjtobin.ie

Drawing No. **2044-1023**

Revision -