# TRAVELLING SHOWMEN'S SITE
# AT
# GORS FARM, GORS ROAD, TOWYN

# SURFACE WATER
# DRAINAGE STRATEGY

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No details prepared as clearly this would be a less sustainable and more expensive option.

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## 1.0 GENERAL INFORMATION

1.1 Gors Farm, Gors Lane, Towyn is a derelict farm and outbuildings which has the benefit of an extant planning consent to enable its re-development as a centre for the use of Travelling Showmen whenever they are operating in North Wales.

1.2 The existing buildings are to be demolished and replaced by a detached house for the manager of the site; some 13 no Park Homes as accommodation for the Travelling Showmen visiting the site and a Workshop and storage area for the maintenance of the Travelling Showmen's equipment.

1.3 Post re-development, the site will be serviced by separate surface water and foul drainage. This strategy considers the provision of surface water drainage and provides a preferred option for its economic and effective delivery.

1.4` As the northern end of the site will be dedicated to the storage and maintenance of Showmen's equipment, it will be necessary to incorporate a petrol/oil separator within the drainage network serving this area.

1.5 In accordance with NRW policy, 33% of the difference in flow between the present and the re-developed site will be retained within the system and released at the present rate of flow.

1.6 The positions and invert levels of manholes are shown on Drg No 007 within Appendix 1 of this document.

1.7 For ease of maintenance, throughout the site, 150 dia plastic pipework has been selected as the preferred choice at a minimum gradient of 1:200. The one exception to this criteria will be the orifice controlling the 33% retained run-off requested by NRW. This retention figure has been calculated as $160m^3$. Copies of the calculations are provided within Appendix 2 of this document. The retention in the form of a pond will be controlled by a 75mm dia discharge pipe to provide the required retention at a working head of water of 1.0m.

1.8 Both watercourses which might receive run-off from the site - the Afon Gele and the Bodoryn Marsh Drain - are within the main river network which is administered and maintained on a regular basis by NRW. Permits will be required for any new surface water outfalls to these watercourses.

1.9 Maintenance of these two watercourses is predominantly carried out by hydraulic excavator fitted with either a Bradshaw or desilting bucket. The NRW have supplied details of the routes used by their plant to gain access to the watercourses. With regard to the Afon Gele, access for maintenance is via the opposite, left bank of the watercourse, outside the site, however, access is required within the site to maintain the Bodoryn Marsh Drain. This maintenance strip will need to be kept clear of obstructions – fences, buildings etc – to avoid impeding the maintenance operation. The ability of the watercourses to accept run-off from the site is dependent upon their regular maintenance.

1.10 The estimated cost of the Preferred Option for surface water drainage is detailed below as Appendix 3 to this document.

## 2.0 DESCRIPTION OF SURFACE WATER DRAINAGE OPTIONS

### 2.1 GRAVITY OUTFALL TO BODORYN MARSH DRAIN AND PUMPED DISCHARGE TO AFON GELE

2.1.1 This first option for surface water drainage relies to a large extent on the site's natural topography, which predominantly falls from north to south towards the Bodoryn Marsh Drainage System. However, the site is relatively flat at its northern end. This was the position of the original farmhouse and yard, which traditionally drained to the Afon Gele on the site's northern boundary. To maintain an overall pattern of drainage from north to south throughout the site would require the raising of the end of the northern end of the site by approximately 1.0m. This action would be expensive to achieve, as a retaining wall or some other form of revetment would be required to maintain the line of the access road along the right bank of the Afon Gele. It has therefore been decided to allow this upper portion of the site to continue to drain to the Afon Gele.

2.1.3 There is however an added complication in the use of the Afon Gele as a point of discharge. The Afon Gele acts as an upland carrier for flows from the higher land to the south and west across the lower Rhuddlan marshlands where the site is situated, to discharge by gravity to the River Clwyd. As such, high water levels can occur within the watercourse under prolonged wet conditions, which would prevent the discharge of surface water by gravity from the site. It is therefore intended to provide a small pumping station to service this upper portion of the site as a safeguard against this loss of outfall.

2.1.4 It is anticipated that pumped discharge to the Afon Gele will be required on very few occasions and that gravity discharge will be possible for the vast majority of the time, however, the pumping facility will be available if required. Furthermore, in the unlikely event of a severe tidal flood event with floodwater overtopping the perimeter defences around the site, in addition to its drainage function, the pumping facility will provide a ready-made sump from which to evacuate flood water. There will also be provision for the use of a diesel pump should electricity supplies be affected. Details of the pumping facility are contained within Appendix 1 of this document together with details of the Preferred Options for both surface and foul water drainage of the developed site.

2.1.5 It would be impractical and obviously more expensive to attempt to drain a larger area of the site to the Afon Gele. The remainder of the site therefore follows the natural topography to discharge to the Bodoryn Marsh Drain.

2.1.6 As the northern end of the site, the area draining to the Afon Gele will be dedicated to the storage and maintenance of Showmen's equipment. Due to the risk of pollution, it will be necessary to incorporate a petrol/oil separator within the drainage network serving this area upstream of the outfall. From the Separator, clean water will be drained to the outfall structure on the right bank of the Afon Gele.

2.1.7 The outfall structure will incorporate a flap valve as protection against high levels within the Afon Gele backing-up through the drain. Upstream of the outfall, the clean water will pass through a sump containing a 100mm dia electric submersible pump controlled by a float switch. This pump will respond to the increase in water level within the sump caused by high levels in the Afon Gele closing the flapped outfall and thereby preventing gravity discharge.

2.1.8 Due to the remote chance of a tidal flood affecting the electricity supply within the site, the switch gear and incoming main supply will be housed within the adjacent Workshop at a minimum level of 6.5m AOD.

2.1.7 The remaining surface water drainage comprising the roof water from the Workshop; highway drainage from the access roads, areas of hard-standing around the Park Homes

within the site and roof water from the Manager's House, will all be combined as shown on Drg No 007 before flowing by gravity to an outfall into the Bodoryn Marsh Drain.

2.1.8 Upstream of this outfall will be a retention feature in the form of a pond capable of retaining $160m^3$ of water controlled by a 75mm dia pipe which is calculated to represent the present rate of run-off of 7.0 l/s from the site under a working head of water of 1.0m.

2.1.9 The estimated rate of 7.0 l/s will not overload the Bodoryn Marsh system which is already receiving the run-off from the site which contains extensive areas of hard-standing.

2.1.10 This means of surface water drainage from the site will require Environmental Permits from NRW for the outfall structures into the Afon Gele and the Bodoryn Marsh Drain.

## 2.2 PUMPED DRAINAGE TO AFON GELE

2.2.1 The only alternative means to drain surface water from the site will be to reverse the natural direction of flow from north to south by pumping all flows to the Afon Gele.

2.2.2 While the Afon Gele has the necessary capacity to receive the additional flow this method of drainage would be wholly reliant on continual pumping. Besides the additional capital and running costs which would be occurred this method is not considered to be a sustainable means of draining the site and has not been progressed further.

## 3.0 SELECTION OF PREFERRED OPTION

3.1 The Preferred Option in this instance is obviously Option 1 - Gravity outfall to Bodoryn Marsh Drain and Pumped discharge to Afon Gele. Besides being the cheapest option, it is clearly the more sustainable since it maximises the use of gravity drainage.

3.2 In addition it provides a means of maintaining drainage in the case of a tidal emergency by providing a ready-made facility within the pumping arrangements to the Afon Gele for the use of an auxiliary diesel pump.

3.3 Drg No 007 Drainage Network provides details of the Preferred Options with regard to both foul and surface water drainage within the site. A copy of this drawing is provided within Appendix 1 of this document.

# APPENDICES

# Appendix 1

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# Appendix 2

Drainage and Retention Calculations