

TECHNICAL NOTE

Job Name: Green Park Platform Extension
Job No: 36382/2012
Note No: 36382/2012/TN001
Date: 09th February 2018
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Subject: **Green Park Platform Extension and Haul Road -
Proposed Surface Water Drainage**

1. Introduction

Peter Brett Associates have been commissioned by Reading Borough Council (RBC) to submit a planning application for the southern extension of the proposed platform at Green Park Station, Reading. This platform extension requires the construction of a haul road from Cottage Lane to a temporary works and compound area to the west of the proposed station, and is subject to approval from West Berkshire Council and Wokingham Borough Council. To obtain planning permission for the original station design, a Flood Risk Assessment (FRA) (reference 28791/4001; date Oct 2014) was submitted to RBC outlining the requirements for the proposed surface water drainage strategy. These requirements have been adopted for the proposed works to the west of the station.

There are two RBC planning conditions relating to surface water drainage as follows:

- RBC Planning Condition 30 – Design of the Surface Water Drainage
- RBC Planning Condition 27 – Avoidance of construction of soakaways in contaminated land.

These planning conditions can be found in **Appendix A**. This Technical Note outlines the design methodology of the proposed surface water drainage scheme for this area, and addresses the planning conditions listed above.

2. Impermeable Areas

The proposed development comprises the following impermeable areas as outlined in **Table 1**.

Location	Increase of Impermeable Area (m ²)
Haul Road	1,159
Temporary Compound	422
Temporary Works Area	2,804
Western Platform Extension	296
Eastern Platform Extension	317

Table 1: Impermeable Areas

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The final construction detail of the haul road is to be confirmed, but on a conservative basis, it is currently assumed to be non-permeable. In such an instance, appropriate attenuation measures will be included following the design principles highlighted in this report.

In addition to the above, 557m² of station platform, to the west of the railway, from the original planning application will drain to the same location as the above. The eastern platform extension drains to the interchange network, which discharges to the existing surface water body to the east of the site in accordance with the conditions listed in **Appendix A**. This leaves an impermeable area of approximately 0.52ha to drain to the drainage channel to the north of the site.

3. Proposed Surface Water Drainage Strategy

Discharge Destination

In accordance with the discharge destination hierarchies of the National Planning Practice Guidance an assessment of the suitability of the site to utilise infiltration drainage techniques has been undertaken.

See the Planning Practice Guidance

This states:

"Generally the aim should be discharge surface runoff as high up the following hierarchy of drainage options as reasonably practicable:

1. *Into the ground (infiltration)*
2. *To a surface water body;*
3. *To a surface water sewer, highway drain or another drainage system;*
4. *To a combined sewer."*

The Geo-environmental Report on Ground Conditions (Document reference 11321 / 4004 Rev 01; dated Oct 2010) outlines that the site to the west of the railway tracks is a historic landfill, which was unlicensed and filled with inert and industrial waste in the 1970s and 1980s, and therefore that the composition of the ground under the site has the potential to detrimentally impact water quality.

The mitigation measures outlined in these geo-environmental reports include a lined drainage system and measures to ensure no uncontrolled discharges, including run off.

As such the proposed surface water strategy will discharge into the existing watercourse – a tributary of the Foudry Brook – via a lined surface water drainage system.

Peak Flow Control – Defra Technical Standard S2

S2. For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

In accordance with best practice the proposed surface water drainage strategy seeks to reduce the peak discharge rate from the site to 'should never exceed greenfield runoff rate'.

In addition, RBC planning condition 30 states that 'run off rates will be limited to greenfield rates and the discharge volumes will be limited either by using infiltration drainage or where this is not practical the run-off rate will be limited to Q_{bar} of 2l/s/ha and additional attenuation provided to ensure no increase of flood risk downstream.'

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As infiltration techniques will not be used due to underlying ground conditions, the proposed drainage scheme will provide attenuation to reduce the total peak discharge rate from the 0.52ha to the lowest practical runoff rate to prevent blockage of the drainage network. The runoff rate will be limited such that it is significantly lower for the new impermeable areas at the site during the 1 in 100 year storm than the equivalent greenfield runoff rate.

Table 3 shows the Calculated Greenfield Runoff Rates for the site.

Rainfall Event	Greenfield Runoff Rate (l/s/ha)	Greenfield Runoff Rate (l/s) (Impermeable Area 0.5ha)
1 in 1 year	3.16	1.58
1 in 30 year	8.32	4.16
1 in 100 year	11.85	5.93
1 in 100 year + 40% CC	-	-

Table 3: Calculated Greenfield Runoff Rates

The EA's Flood Risk Assessments: Climate Change Allowances guidance which supports the NPPF provides contingency allowances for potential increases in sea level rise, peak river flow and rainfall intensity.

In accordance with this guidance, the potential for increased pluvial (rainfall) flood probability as the result of possible climate change has been taken into account, over the lifetime of the development, through a +40% allowance for increases in peak rainfall intensity within the surface water drainage design. This represents the upper end limit for the climate change period up to 2115 and has been utilised for design purposes as a conservative approach at this stage (see **Table 4**).

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper End	10%	20%	40%
Central	5%	10%	20%

Table 4: Flood Risk Assessments: Climate Change Allowances

In order to demonstrate that the proposed peak discharge rates are deliverable within the development layout the surface water drainage network will be modelled and provided as part of the detailed design submission.

Volume Control - Defra Technical Standard S4

S4. Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

The development proposals will increase the existing level of impermeability across the site and as such the volumetric run-off will be increased. However, the proposed drainage scheme will introduce attenuation and reduce the peak rate of run-off to the practical minimum. Therefore, the volumetric run-

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off will be reduced in any given storm duration compared to the existing unrestricted greenfield run-off rate.

Flood Risk within the Development – Defra Technical Standards S7 to S9

S7. The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

S8. The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement) or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

The proposed outline surface water drainage network has been designed to demonstrate that the peak discharge rate can be achieved with no flooding of the station platform in a 1 in 30 year or a 1 in 100 year rainfall event.

SuDS Selection

The current planning policy and guidance advises that SuDS in the form of open or near surface systems employing natural processes should be used where possible, not that they must be used. They can also provide opportunities to combine water management with amenity and wildlife, but only where appropriate.

For the Green Park Haul Road and western platform development it is considered that open surface SuDS are not appropriate due to the risk of contamination from below ground.

Storage will be provided for the primary attenuation required for management of the 100 year + 40% storm event. Initial analysis of the proposed impermeable area indicates that 200 – 250m³ of attenuation storage will be required for the 100 year + 40% storm

Structural Integrity – Defra Technical Standards S10 & S11

S10. Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.

S11. The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.

The components that make up any drainage network have different life expectancies which can be greatly affected by the effectiveness of their maintenance regime and upstream sediment capture/management. This will be taken into consideration when undertaking the detailed design of the drainage system at the site.

4. Maintenance Strategy

This section sets out the inspection and maintenance requirements for long term management of the development's surface water drainage system. Long term maintenance work to the station platform drainage system is to be undertaken by Reading Borough Council. Reading Borough Council will also

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be responsible for the maintenance of the haul road drainage network until the haul road lease expires and it is handed over to the current landowner.

Health, Safety and Welfare

All those responsible for maintenance should take appropriate health, safety and welfare precautions for all activities including lone working, if relevant, and risk assessments should always be undertaken. The site's infrastructure Health and Safety File should be consulted before carrying out any works either inside or outside of the development's boundary and information regarding the location of existing utilities passed on to operatives.

The requirements of the Health and Safety at Work Act 1974 and The Construction (Design and Management) Regulations 2015 should be adhered to and any residual risks identified in the Health and Safety File should be managed and information passed on to maintenance operatives through task specific risk assessments.

Operation and Maintenance

There are three types of maintenance activities associated with surface water drainage systems. The SuDS Manual, CIRIA C753, defines these as:

- Regular Maintenance – *'basic tasks undertaken on a frequent and predictable schedule' including vegetation management, litter and debris removal, and inspections.'*
- Occasional Maintenance – *'tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).'*
- Remedial Maintenance – *'intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.'*

Specific maintenance needs should be monitored and maintenance schedules adjusted to suit the location and condition of the drainage feature in question.

5. Conclusion

Technical Note No TN02/GEO outlines that for the protection of the controlled waters the proposed surface water drainage system is to be lined and therefore, the site will not use infiltration drainage techniques. As such the proposed surface water strategy will discharge into the existing surface water drainage channel to the north of the site.

The proposed drainage scheme will provide attenuation to reduce the total peak discharge rate to the lowest practical minimum for the 1 in 100 year + 40% climate change rainfall event, this will be designed to represent a reduction of the existing greenfield run-off rate.

In accordance with Table 3, the EA's Flood Risk Assessments: Climate Change Allowances guidance, an allowance of 40% has been added to the peak rainfall intensities in the 1 in 100 year design storm event to account for the potential effects of climate change.

The proposed surface water system will utilise appropriate attenuation measures to manage runoff. The system will follow the principles of the NPPG SuDS requirements by reducing flood risk and incorporating measures for the removal of pollutants.

As the landowner, Reading Borough Council will be responsible for the long-term maintenance of the proposed station drainage network and will undertake inspection and maintenance in accordance with this Strategy. When the haul road area is handed back to the current landowner, they will become responsible for the maintenance of the drainage infrastructure on the road.

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As a result, the principles advocated by relevant national, regional and local planning policy guidance will be satisfactorily addressed.

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Manager)
36382-2011-TN001	-	09.02.17	RT	EE	RF	

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Appendix A

Planning Conditions relating to surface water drainage and flood risk.

RBC Planning condition 27 states the following:

The development hereby permitted shall not be commenced until such time as a scheme to dispose of surface water that ensures that no soakaways are constructed in contaminated ground, has been submitted to, and approved in writing by the Local Planning Authority. The scheme shall be implemented as approved.

Core Strategy Policy CS34: Pollution and Water Resources

RBC Planning Condition 29 states the following:

The development hereby permitted shall only be carried out in accordance with approved Flood Risk Assessment (FRA) ref: 28791/4001 undertaken by Peter Brett Associates, dated October 2014.

Reason: To reduce the risk of flooding. This condition is imposed in accordance with the National Planning Policy Framework (March 2012), and Policy CS16 of the West Berkshire Core Strategy (2006-2026).

RBC Planning condition 30 states the following:

No development shall commence on the railway station hereby approved until a surface water drainage scheme has been submitted to and approved in writing by the Local Planning Authority. Before these details are submitted an assessment shall be carried out of the potential for disposing of surface water by means of a sustainable drainage systems March 2015, and the results of the assessment provided to the local planning authority. Where a sustainable drainage scheme is to be provided, the submitted details shall:

- i. provide information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of the receiving groundwater and/or surface waters;
- ii. Include a timetable for its implementation; and
- iii. provide a management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime. Run off rates will be limited to greenfield rates and the discharge volumes will be limited either by using infiltration drainage or where this is not practical the run-off rate will be limited to Q_{bar} of 2l/s/ha and additional attenuation provided to ensure no increase of flood risk downstream.
- iv. Thereafter, the railway station shall not be brought into use until the surface water drainage scheme has been implemented in accordance with the requirements of part ii) of this condition. Thereafter the approved surface water drainage scheme shall be maintained and operated in accordance with the approved details.

Reason: To prevent the increased risk of flooding, to improve and protect water quality, improve habitat and amenity, and ensure future maintenance of the surface water drainage system. This condition is imposed in accordance with the National Planning Policy Framework (March 2012), Policy CS16 of the West Berkshire Core Strategy (2006-2026), and Supplementary Planning Document Quality Design (June 2006).