CAMBRIDGE SCIENCE PARK STATION AND INTERCHANGE

Appendix 28 – Response from Environment Agency on Flood Risk and Drainage Detail

APRIL 2013
Dear Sir

CAMBRIDGE SCIENCE PARK STATION - PRE APPLICATION DETAIL, RAILWAYS SIDINGS, CHESTERTON, CAMBRIDGE.

Following your recent submission and site meeting with the Agency we have the following comments to make for your assistance.

Floodrisk & Surface Water Drainage:
The applicant should consider the following in their surface water drainage design;

The Agency's criteria is that surface water discharge from the developed site should mimic that of an undeveloped greenfield site, up to and including a 1 in 100 year critical duration storm event. Greenfield run off rates are generally between 2 - 8 l/s/ha for storm events up to the critical 1 in 100 year return period event.

The applicant should also, as part of the surface water strategy, demonstrate that the requirements of any local surface water drainage planning policies have been met and the recommendations of the relevant Strategic Flood Risk Assessment and Surface Water Management Plan have been considered.

Surface Water Drainage
For sites greater than 1 Hectare in size, a surface water strategy should be carried out as part of a FRA to demonstrate that the proposed development will not create an increased risk of flooding from surface water. The surface water strategy should be carried out in accordance with the National Planning Policy Framework and the PPS25 Practice Guide, giving preference to infiltration over discharge to a watercourse, which in turn is preferable to discharging to surface water sewer.

Drainage Scheme Requirements
Infiltration rates should be worked out in accordance with BRE 365. If infiltration methods are likely to be ineffective then attenuation may be appropriate. In any case the surface water strategy should clearly show that:

- Peak discharge rates from site will not increase as a result of the proposed development, up to a 1 in 100 chance in any year including an allowance for climate change storm event and should be reduced where possible. We would encourage all developers to strive to achieve Greenfield runoff rates to reduce the impact of the development on the surface water drainage infrastructure.
Storage volumes required on site up to a 1 in 100 chance in any year including an allowance for climate change storm event can be provided;

The site will not flood from surface water up to a 1 in 100 chance in any year including an allowance for climate change storm event, or that any surface water flooding can be safely contained on site up to this event.

**Sustainable Drainage Techniques**

All surface water strategy should strive to utilise sustainable drainage techniques, in accordance with the SuDS management train (Ciria C609). Guidance on the preparation of surface water strategies can be found in the Defra/Environment Agency publication "Preliminary rainfall runoff management for developments". Guidance on climate change allowances can be found within the National Planning Policy Framework Technical Guidance.

SuDS are an approach to managing surface water run-off which seeks to mimic natural drainage systems and retain water on or near the site as opposed to traditional drainage approaches which involve piping water off site as quickly as possible. SuDS involve a range of techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands. SuDS offer significant advantages over conventional piped drainage systems in reducing flood risk by attenuating the rate and quantity of surface water run-off from a site, promoting groundwater recharge, and improving water quality and amenity.

The variety of SuDS techniques available means that virtually any development should be able to include a scheme based around these principles.

Further information on SuDS can be found in:
- CIRIA C522 document Sustainable Drainage Systems – design manual for England and Wales
- CIRIA C697 document SuDS manual

Strategic Flood Risk Assessments (SFRA) are undertaken by local planning authorities as part of the planning process. The SFRA may contain information to assist in preparing site-specific Flood Risk Assessments (FRA). Applicants should consult the SFRA while preparing planning applications. Please contact your local authority for further information.

**Groundwater & Contaminated Land (GWCL):**

In the eventuality of a formal planning application being submitted the Agency’s response would likely include the following GWCL comments and recommendations:

We have reviewed the ATKINS, Chesterton Interchange Sidings, Draft Ground Investigation Report and Land Contamination Assessment, Cambridge County Council.

Our technical comments on these reports are attached; we will expect that these are addressed in future submissions.

Please note that any reference to controlled waters includes inland freshwaters, coastal waters and relevant territorial waters plus groundwater as may be relevant for the proposed development site.
Environment Agency position.
We consider that planning permission could be granted to the proposed development as submitted if the following planning conditions are included as set out below. Without the conditions, the proposed development on this site poses an unacceptable risk to the environment and we would object to the application.

Condition 1. No development approved by this planning permission shall take place until a scheme that includes the following components to deal with the risks associated with contamination of the site shall each be submitted to and approved, in writing, by the local planning authority:

1) A preliminary risk assessment which has identified:
   - All previous uses
   - Potential contaminants associated with those uses
   - A conceptual model of the site indicating sources, pathways and receptors
   - Potentially unacceptable risks arising from contamination at the site

2) A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to the risk of all receptors that may be affected, including those off site.

3) The results of the site investigation and detailed quantitative risk assessment referred to in (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.

4) A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in the remediation strategy in (3) are complete and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.

Any changes to these components require the express written consent of the local planning authority. The scheme shall be implemented as approved.


Condition 2. No occupation of any part of the permitted development shall take place until a verification report demonstrating completion of works set out in the approved remediation strategy and the effectiveness of the remediation shall be submitted to and approved, in writing, by the local planning authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met. It shall also include any plan (a "long-term monitoring and maintenance plan") for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action, as identified in the verification plan. The long-term monitoring and maintenance plan shall be implemented as approved.
Reasons. To protect and prevent the pollution of controlled waters (particularly the River Terrace deposits; a Secondary aquifer and the river Cam; protected waterbody under the EU Water Framework Directive) from potential pollutants in line with Environment Agency Groundwater Protection (GP3:2012) position statements J6 and J7. See also Reason 1.

Condition 3. If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the local planning authority) shall be carried out until the developer has submitted a remediation strategy to the local planning authority detailing how this unsuspected contamination shall be dealt with and obtained written approval from the local planning authority. The remediation strategy shall be implemented as approved.

Reasons. To protect and prevent the pollution of controlled waters (particularly the River Terrace deposits; a Secondary aquifer and the river Cam; protected waterbody under the EU Water Framework Directive) from potential pollutants in line with Environment Agency Groundwater Protection (GP3:2012) position statements J6 and J7. See also Reason 1.

Condition 4. Infiltration systems should only be used where it can be demonstrated that they will not pose a risk to groundwater quality. A scheme for surface water disposal needs to be submitted to and approved by the local planning authority. The scheme shall be implemented as approved.

Reason. To protect and prevent the pollution of controlled waters (particularly the River Terrace deposits; a Secondary aquifer and the river Cam; protected waterbody under the EU Water Framework Directive) in line with the National Planning Policy Framework (paragraph 109) and the Environment Agency’s Groundwater Protection (GP3:2012) position statements G1 to G13 inclusive. The water environmental is potentially vulnerable and there is an increased risk of pollution from inappropriately located and/or designed infiltration sustainable drainage systems (Suds), such as soakaways, unsealed porous paving systems or infiltration basins. See also Reason 1.

Condition 5. Using penetrative methods shall not be permitted other than with the express written consent of the local planning authority, which may be given for those parts of the site where it has been demonstrated that there is no resultant unacceptable risk to groundwater. The development shall be carried out in accordance with the approved details.

Reason. To protect and prevent the pollution of controlled waters in line with Environment Agency Groundwater Protection (GP3:2012) position statement Part N, N7 and N8. Piling or any other foundation designs using penetrative methods can result in risks to potable supplies from, for example, pollution / turbidity, risk of mobilising contamination, drilling through different aquifers and creating preferential pathways. Thus it should be demonstrated that any proposed piling will not result in contamination of groundwater.

Advice to LPA.
1. This condition has been recommended as we are not confident that the results of the site investigation provide sufficient information to prove there is a low risk to controlled waters. Further work will be required in order to assess the impact of recorded groundwater contamination on site to identified receptors. Following the results of these further works, a Detailed Quantitative Risk Assessment (DQRA) along with a refined Conceptual Site Model (CSM) should be submitted. This is due to the sensitivity of the
site, as the majority of the site it is immediately underlain by a Secondary aquifer which
is likely to form an important source of baseflow to the River Cam; an EU WFD
protected waterbody. A meeting was held with Atkins on 28 March 2013 to discuss
latest findings included in the submitted Draft Ground Investigation Report and further
work that is necessary to be carried out to determine the level of risk to identified
receptors and discuss the suitability of a proposed drainage scheme. These are
discussed in our technical comments attached in our response. The Desk Study and
PRA element of the ATKINS, Chesterton Interchange Sidings, Draft Ground
Investigation Report and Land Contamination Assessment, Cambridge County Council,
March 2013 is satisfactory and no further work on part (1) of Condition 1 is considered
necessary with respect to controlled waters.

The Local Planning Authority must decide whether to obtain such information prior to
determining the application or as a condition of the permission. Should the Local
Planning Authority decide to obtain the necessary information under condition we would
request that this condition is applied.

The site is underlain by the Gault Formation (Mudstone) of the Selborne Group which is
considered as Unproductive strata due to their high clay content and low permeability.
The majority of the site is overlain by River Terrace deposits (sand and gravel),
considered as Secondary aquifer. Secondary aquifers are geological strata that exhibit
high permeability and provide high levels of water storage, supporting water supply
and/or form an important base flow to rivers. The main surface water features present
near the site is the River Cam, located approximately 500m east of the site, which is a
protected waterbody under the EU WFD. The site is understood to have been
historically occupied by a number of railway lines and sidings in the past 120 years and
there is an infilled gravel pit, later on formed as a pond, located in the northwestern
corner of the site. Groundwater levels are quite shallow (maximum recorded level 0.16m
bgl) and within the River Terrace deposits.

2. It is important that remediation works, if any, are verified as completed to agreed
standards to ensure that controlled waters are suitably protected. If the works to comply
with our Condition 1 find no contamination or that the risks from any such contamination
are acceptable, then works to comply with this condition will not be required.

3. Land contamination investigation and assessment can provide a robust
understanding of the contamination present and any necessary remedial action
required. However with all due diligence, contamination can still be missed by an
investigation and this condition gives the LPA the ability to require a new, or
amendments to an existing, remediation strategy for any previously unexpected
contamination which subsequently comes to light.

4. Soakaways and other infiltration sustainable drainage systems (SuDS) must not be
constructed in contaminated ground. The water environment is potentially vulnerable
and there is an increased potential for pollution from inappropriately located and/or
designed infiltration sustainable drainage systems (SuDS) such as soakaways,
unsealed porous pavement systems or infiltration basins. We understand an
impermeable membrane is proposed to be installed on site as part of the site’s drainage
scheme due to recorded shallow groundwater. This scheme is to be reviewed following
further site work carried out by ATKINS, as discussed in meeting held on 28 March
2013.
5. We recommend that piling on contaminated sites is avoided where possible, and that non-invasive methods, such as rafts, should be used instead. Where there is no alternative to piling, a method should be selected that minimises the risks of groundwater pollution or gas migration. Mitigation measures and/or environmental monitoring may need to be incorporated into the design. The method selected should be presented in a "Foundation Works Risk Assessment Report" which should be submitted to and approved by the Local Planning Authority before development commences.

**Advice to applicant**

Land contamination investigations should be carried out in accordance with BS 5930:1999-2010 'Code of Practice for site investigations' and BS 10175:2011 'Investigation of potentially contaminated sites - Code of Practice' as updated/amended. Site investigation works should be undertaken by a suitably qualified and experienced professional. Soil and water analysis should be fully MCERTS accredited.

Any further site investigation, demolition, remediation or construction works on site must not create new pollutant pathways or pollutant linkages in to the underlying principal aquifer to avoid generating new contaminated land liabilities for the developer. Clean drilling techniques may be required where boreholes, piles etc penetrate through contaminated ground.

The CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2) provides operators with a framework for determining whether or not excavated material arising from site during remediation and/or land development works are waste or have ceased to be waste. Under the Code of Practice:

- excavated materials that are recovered via a treatment operation can be re-used on-site providing they are treated to a standard such that they are fit for purpose and unlikely to cause pollution
- treated materials can be transferred between sites as part of a hub and cluster project
- some naturally occurring clean material can be transferred directly between sites.

Contaminated soil that is, or must be disposed of, is waste. Therefore, its handling, transport, treatment and disposal is subject to waste management legislation, which includes:

- Duty of Care Regulations 1991
- Hazardous Waste (England and Wales) Regulations 2005
- Environmental Permitting (England and Wales) Regulations 2010
- The Waste (England and Wales) Regulations 2011

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, including in line with British Standards BS EN 14899:2005 'Characterisation of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' for waste to be removed from site, and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

If the total quantity of waste material to be produced at or taken off site is hazardous waste and is 500kg or greater in any 12 month period the developer will need to register with us as a hazardous waste producer.
We would welcome the use of sustainable drainage systems at this site provided they could be demonstrated to pose an acceptable level of risk to controlled waters.

We therefore offer the following advice on the design and location of sustainable drainage systems in accordance with position statement G1 to G13 of our GP3 (2012) document:

- Soakaways and other infiltration systems must not be constructed in contaminated ground. The use of infiltration drainage would only be acceptable if a phased site investigation showed the presence of no significant contamination.
- The maximum acceptable depth for infiltration systems is 2.0 m below ground level, with a minimum of 1.2 m clearance between the base of infiltration system and peak seasonal groundwater levels. We consider that deep bore and other deep soakaway systems are not appropriate in areas where groundwater constitutes a significant resource (that is where aquifer yield may support or already supports abstraction). Deep soakaways increase the risk of groundwater pollution.

We recommend that developers should:
1. Follow the risk management framework provided in CLR11, ‘Model Procedures for the Management of Land Contamination’, when dealing with land affected by contamination;
2. Refer to our “Guiding Principles for Land Contamination” for the type of information that we require in order to assess risks to controlled waters from the site. The Local Authority can advise on risk to other receptors, for example human health;
3. Refer to our “Verification of Remediation of Land Contamination” report;
5. Refer to our ‘Position Statement on the Definition of Waste: Development Industry Code of Practice’;
6. Refer to our “Technical Aspects of Site Investigations” Technical Report P5-065/TR; and
7. Refer to our website at www.environment-agency.gov.uk for more information.

Technical Comments.
Please find below our technical comments for the ATKINS, Chesterton Interchange Sidings, Draft Ground Investigation Report and Land Contamination Assessment, Cambridge County Council, March 2013. A meeting was held with ATKINS on 28 March 2013 to discuss further work that is required to assess the risk from soil and groundwater contamination to identified receptors. We will expect these to be addressed in future submissions:

1. The chemical testing results carried out on soil and groundwater samples have identified elevated concentrations of heavy metals and hydrocarbons within the soil and groundwater on site. It is understood that the source of contamination is not ascertained at this time and ATKINS have confirmed that further work will be carried out to establish this.
2. ATKINS have agreed to carry out sampling in the River Cam (upstream and downstream) to establish the impact from the identified groundwater contamination, as the River terrace deposits is likely to form an important baseflow source to the River Cam.
3. Further details will be required on groundwater dewatering during the engineering works carried out on site and proposed mitigation measures.
4. Following completion of further works carried out on site, details on the proposed impermeable membrane such as location, design and pollution prevention measures will need to be submitted for us to review.

5. Following completion of further works carried out on site, a proposed Remediation Strategy will need to be submitted for us to review. We agree that an impermeable membrane will reduce infiltration on site and prevent further leaching of contaminants present within the soil; however the contaminated soils will need to be removed to break pollutant linkage as they can still act as a source of contamination. Further monitoring will be required following their removal.

6. Further monitoring and sampling has been proposed to be carried out on site to understand the behaviour of the groundwater table and the level of contamination in the River Cam. The groundwater flow direction will need to be established on site and a Detailed Quantitative Risk Assessment will need to be submitted for us to review.

Please be advised that the comments contained within this correspondence represent the informal opinion of an officer of the Environment Agency. These comments are made without prejudice to any subsequent response to the local planning authority to any formal planning consultation. We reserve the right to change our position in relation to any such application.

Yours faithfully

Mr. T.G. Waddams
Planning Liaison Officer

Direct e-mail planning_liaison.anglian_central@environment-agency.gov.uk

c.c: Ann Barnes CCC
MEETING NOTES

Meeting held at the Environment Agency offices, Brampton on 28th March 2013 commencing at 10:30am.

Present

Petrula Mantzos  Environment Agency
Lindsay Petcher  Environment Agency
Jennifer Gough  Cambridgeshire County Council
Simon Bunn  Cambridge City Council
Paul Budd  Atkins

The meeting was to discuss the issues arising from the draft ground investigation report issued to the Environment Agency on the 8th March 2013.

PB presented a plan showing the location of the site within the Chesterton Sidings and confirmed that the original drainage concept was to drain the site by infiltration. As the ground water table was known to be high the use of infiltration blankets under the pavements was considered to be the way forward at that time.

PB confirmed that the results within the ground investigation report found that whilst the type of contamination varied across the site the whole of the proposed site had levels of contamination that exceeded the accepted standards. PB proposed that the way forward would be to place an impermeable membrane over the contaminated ground and discharge the surface water from the site to the River Cam via an attenuated drainage system.

PM confirmed that the issue was the contaminates on the site reaching the River Cam. The source of the contaminates within the ground water was discussed as the sidings may not be the only source of contamination in the area. PM suggested that sampling of the River Cam be undertaken to establish the levels of contamination in the river and the potential for this contamination to be from the site. PB confirmed that sampling had already been put in hand at three locations, south of the railway bridge crossing of the river, opposite the sidings and just upstream of the First Public Drain discharge point into the River Cam. After further discussions it was agreed that water samples should also be taken from the water bodies west of the sidings. JG and SB advised that they were aware of other ground investigations having taken place in the locality; they would seek to obtain the results of those investigations so that a comparison can be made with this site.

PM confirmed that, whilst placing an impermeable membrane over the contaminated ground would reduce the leaching of contaminants from the soils, contaminates in the soils would however remain a potential source of contamination. The remove the source of contamination is what is required.

PB asked that if the contaminated soils were removed would infiltration drainage be acceptable. He suggested that if, say 1.0m of the contaminated soil was removed a permeable pavement of say 450mm thick could be laid. It was noted that the data presented in the GI report indicated that the ground water was in places less than 1.0m below existing ground level. It was accepted that this concept could be a way forward.

It was agreed that the monitoring of the levels of the ground water within the site should continue for as long as possible. Once an understanding of the behaviour of the ground water table and the level of contamination in the River Cam was gained a further meeting would be convened to determine the way forward.

General discussions were had regarding the potential for further development within the area. It was confirmed that the site would remain in the ownership of Network Rail and that the site would be operated by whoever held the franchise for operating the railway station. The car park and access road from the current end of Cowley Road would not be adopted, but the guided busway would be maintained and operated by the County Council.
The purpose of the meeting was to open discussions with the drainage authorities, to advise them of what is proposed and to establish what input they will require enabling drainage designs to be approved.

- The current proposals for the layout of the station interchange and the accesses to the interchange were explained to the meeting. It was stated that the preferred method for draining the site and the access roads was by direct infiltration.
- Locally the ground water table is high in the sands and gravels, monitoring of the ground water levels will need to take place to establish if infiltration drainage can be used.
- The First Public Drain may have capacity for some run off but being located at the top of the site is unlikely to be able to accept any significant quantity.
- The redundant section of the First Public Drain that runs under the sidings may provide an outfall but will need extensive investigations to be undertaken on the existing route to establish if this is viable. Issues with landowners and the condition of the drain exist. Again the FPD being located towards the top of the site reduces its ability to accept significant quantities of surface water discharge.
- The likelihood of contamination within the sidings and the effect that this may have on any permitted discharge to ground or surface water systems was discussed at length as were the types of pollution control measures that might be required.
- Options for dealing with the surface water runoff in order of preference, direct infiltration, indirect infiltration, attenuated discharge to surface water systems and pumping.
- Rate of discharge to surface water systems will be in the order of 2.0l/s/ha with 30% climate change.
- If the Flood and Water Act 2010 section 3 is brought in in October as currently planned a detailed design will be required to be submitted with the FRA for planning. This design can be modified/revised at a later date with the consent of the SAB’s.
- Draft submission of drainage proposals will be accepted for comment, to be issued to Rachel Hobbs and copied to Simon Bunn, Jennifer Gough and Pat Matthews.
- If a meeting is needed to discuss a drainage proposal details of that proposal to be issued to Rachel Hobbs (SAB’s) a week before the meeting if possible.
- Feasibility plans of the current favoured options were issued to the meeting. The meeting was advised that consultations with the Planners had yet to take place so the detailed layout had yet to be established.

Actions:

Produce plan indicating the locations of the ground water monitoring wells and get them installed ASAP.
Update those producing the FRA of the current thinking with regard to drainage.