23rd July 2015

Annwyl Madam/Syr / Dear Madam/Sir

CARDIFF LOCAL DEVELOPMENT PLAN 2006-2026: CONSULTATION ON MATTERS ARISING CHANGES

Thank you for your consultation on Matters Arising Changes, which we received on 10th June 2015.

We note that the proposed changes refer to the elements of the LDP Written Statement and the proposals map as set out in the Matters Arising Changes Schedule, which have emerged during Hearing Sessions 1-19. We note that there have been related updates to the Sustainability Appraisal and Habitats Regulations Assessment.

Our detailed comments on the matters arising changes only are given in the appropriate forms enclosed with this letter.

We trust our letter conveys our position clearly, however, should you have any further queries, please contact our Senior Development Planning Advisor, Mrs Jackie Walters in the first instance.

Yn gywir / Yours faithfully

Gemma Beynon
Arweinydd Tim Cynllunio Datblygu/Team Leader Development Planning

cc. James Clemente, Strategic Planning, Cardiff City Council
    Stuart Williams, Strategic Planning, Cardiff City Council
    Tracey Smith, Programme Officer
Matters Arising Changes Representation Form

As part of the Examination into the Cardiff Local Development Plan (LDP) a number of Matters Arising Changes have been proposed to the LDP. These changes are set out in the Matters Arising Changes Schedule. This is your opportunity to comment on the Matters Arising Changes. All comments previously made at Deposit stage have already been considered by the Inspectors and so this form should only be used to comment on the Matters Arising Changes.

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Signed:               Date: 23rd July 2015
PART 2: Commenting on Matters Arising Changes

Which Matters Arising Changes do you wish to comment on (Please refer to the Matters Arising Changes Schedule)

Matters Arising Changes reference (e.g. MAC 1)

MAC18 Object

If you are objecting to a change it would be helpful if you could indicate which Test of Soundness you consider it to fails (Please refer to guidance note).

CE2

Please note if you do not identify a test it will not mean your comments will not be considered.

PART 3: Your Response

Your comments should be set out in full and relate to the Matters Arising Changes only.

Please use the space provided to set out your representation. Please be explicit as to which ‘matters arising change’ your comments relate to.

(Continue on a separate sheet/expand box if necessary)

Page 33, MAC18, Chapter 5, Policy H1 Non-Strategic Housing Sites
H1.4 Former Lansdowne Hospital.

We note from the Matters Arising Changes that non-strategic site H1.4 Former Lansdowne Hospital is to be allocated the Local Development Plan.

We maintain our view which is based on the evidence currently presented to us in that we do not support the allocation of H1.4 because the risks and consequences of flooding (to the immediate access road within the site) cannot be managed down to an acceptable level.

There has been discussion and correspondence between parties, our technical response to the letter from Waterman Group of 8th July 2015 (ref. C 16859 150708 LC L) is attached
PART 4: What Happens Next?

All comments received by the closing date will be forwarded directly to the Inspectors for consideration; noting that they will not receive a response from the Council. Should the Inspectors decide that further hearing sessions are necessary please indicate whether you would want to speak at a session. It is important to note that written comments will be given the same weight by the Inspectors as those made verbally at a hearing session.
4a) Do you want your comments to be considered by ‘written representations’ or do you want to speak at a hearing session?

(Please tick ✓ one of the following)

I do not want to speak at a hearing session and am happy for my written comments to be considered by the Inspector.

I do want to speak at a hearing session.

4b) If you wish to speak, please confirm which part of your representation you wish to speak to the Inspector about and why you consider it to be necessary to speak at the Hearing

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Cardiff Council
Room 131
City Hall
Cathays Park
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CF10 3ND

Telephone: 029 2087 1297
E-mail: LDP@cardiff.gov.uk
# Tests of Soundness

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Matters Arising Changes reference (e.g. MAC 1)

MAC5 and MAC6 Object

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Tests of Soundness C2, CE1 and CE2.

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Pages 10-16, MAC5, Chapter 4, Policy KP2 Strategic Sites, KP2 New Key Policies, KP2 (A) to (H), Sources 2.2, 6.2, 7.1, 7.3, 8.1, 8.3, 10.13, 12.1, 13.16 and 16.2

Pages 16-18, MAC6, Chapter 4, Policy KP4 Master Planning Approach Paragraphs 4.84-4.85, Sources 2.2, 6.2, 7.1, 7.3, 8.1, 8.3, 10.13, 12.1, 13.16 and 16.2

Pages 137 – 171 Appendix Two: MAC5 New Key Policies, KP2(A) to KP2(H)

We refer to our previous representations on Strategic Site H and also our representations on Masterplanning Framework Document (relating to Strategic Sites F, G, D, E and C).

Strategic Site H: South of St Mellons Business Park

We note from matters arising changes, KP2 (H) allocates Strategic Site H, South of St Mellons Business Park. We refer to our previous letters;
- 5th January 2015 (Ref. 2548.D9 and A42) relevant to hearing session 5.
- 19th March 2015 (ref. 2548. HS5 AP5) Technical Note Fluvial Flood Risk Mitigation.
- 19th March 2015 (ref. 2548. HS5 AP5) Reen Management; and
- 21st April 2015 (ref. 2548 HS5 AP5 SOCG)

Our view remains that Strategic Site H should be not be allocated given the presumption against development in the Site of Special Scientific Interest (SSSI), in accordance with Planning Policy Wales (Paragraph 5.5.8). We do however, welcome the information submitted to date, which has answered our flood risk management concerns with the allocation of Strategic Site H.

Masterplanning Framework Document (relating to Strategic Sites F, G, D, E and C).

We refer to our letters of;
- 5th January (ref. 2548) and 29th April (ref. 2548.HS7 AP3 HS13) in respect of hearing session 7 and related action point 3; and
- 26th January 2015 (ref. 2548) and 29th April (ref. 2548.HS7 AP3 HS13 AP16) in respect of hearing session 13 and related action point 16.

We are aware that the Council has carefully considered our earlier views in respect of the Masterplanning Framework (MPF) document. As explained in the Council’s Statement, we note that they have assessed all site specific measures raised by NRW and these have been included in new Strategic Policies, KP2 (A) to (H), where considered necessary.

We would also agree that generic matters covered by national policy and other Plan policies (including KP4, KP5, KP16, EN5, EN6, EN7 and EN8) should not be repeated to avoid unnecessary repetition. We are satisfied with the general approach and we provide our detailed comments and advice on the new Strategic Policies as part of our response to matters arising changes.

We support the Council’s approach of embedding more detail and clarity into the Plan through the inclusion of new strategic site specific policies. These matters relate to the embedding of Masterplan detail into the Local Development Plan. We understand that these policies are intended to provide the necessary statutory framework to sit above the Development Management process. Our view, however, is that the following matters
should be incorporated into the Local Development Plan (LDP).

It is unclear how our comments relating to Section 1 ‘Master planning general principles’ have been dealt. Those aspects raised by us in our letter of 5 January include the following aspects, which do not appear to have been addressed in the revisions. These would appear to be relevant to each of the strategic sites and would appear to have merit for being included in the master planning general principles. These include:

Section 8 Connected Strategic Open Spaces

- Changes to third bullet point, Section 8 ‘design in and provide green corridors and conservation measures at the outset’. We are particularly keen to ensure that this occurs, with any new planting to ensure / enhance green corridors and is a principle which underpins the MPF;
- 4th bullet point ....‘robust habitat connectivity...well connected and dark, green corridors are provided’;
- Additional bullet: ‘where infrastructure...crosses green corridors...ensure that these are designed to maximise ecological functionality of these crossing points’; and
- Additional bullet: ‘site facilities likely to require major lighting infrastructure, such as floodlighting away from key areas for biodiversity.’

Section 9 ‘what this means’

- Ensure creation of new habitats will be delivered at the outset of development; and
- Ensure Green Infrastructure is in place prior to commencement of development.

Of these, the delivery of new habitats and planting prior to the commencement of the development to ensure robust Green Infrastructure as set out in a number of the above points is particularly important; as are the additional bullets suggested for Section 8.

We note that a number of our observations have been incorporated into the site specific principles, but note that our comments on the master planning principles do not appear to have been taken up. We are of the view that these principles are relevant to each of the strategic sites and therefore have merit for being included in the master planning general principles. We have raised the points with respect to the strategic sites, which are already at the planning application stage.

Site Specific Frameworks

Each of the strategic sites has sections titles ‘Essential / Enabling Infrastructure and Necessary Infrastructure.’ What is the rationale for selection of items under each of these and the significance of the difference? Green infrastructure has not been listed in either of these.

We welcome that each of the strategic site frameworks has a section relating to landscape and biodiversity assets which seeks to link retained habitats.

With respect to Strategic Site C, we note and welcome the changes. We note that any strategy to conserve Great Crested Newts may require additional ponds, but accept that this could be dealt with via the planning application process.
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| CE3  | There are clear mechanisms for implementation and monitoring. |
| CE4  | It is reasonably flexible to enable it to deal with changing circumstances. |
Dear Jackie,

CARDIFF LOCAL DEVELOPMENT PLAN 2006-2026
HEARING SESSION 9: H1.4 LANSDOWNE HOSPITAL ACTION POINT 7

Further to your letter dated 18th June 2015 which provided NRW advice regarding the risks and consequences of flooding at the Lansdowne Hospital Site together with more detailed comments relating to the hydraulic modelling carried out as part of the assessment of flood risk at the Site, I have the following comments to make. I have reviewed the comments made by NRW, and have summarised the main concerns below (black), together with my comments (blue). I would be grateful if you would consider my comments, and also forward this letter to Gary Purnell for his comments.

- While the results show the buildings for the residential flats will be designed flood free, the immediate access road and public open space is not designed flood free.

Please note that the area designated as Public Open Space is to provide the flood compensatory area. This area will remain undeveloped. Therefore, when the final Site Masterplan is formulated, this area will be designated as ‘Flood Compensatory Area’ and will not be an area of Public Open Space. Based on this, it is assumed that the requirement for the space to remain flood-free is no longer applicable. As a Flood Compensatory Area, the area has to accommodate floodwaters as part of it’s function.

- In summary, …. Maximum flood depths along the access road are only slightly lower than those within the public open space and these depths alone are considered to have a hazard rating of ‘Danger for Most’. Our view therefore is that the development is not designed in accordance with the requirements of A1.14 and A1.15 for these elements of the development.

The proposed Site layout indicates the access road will run along the southern boundary. It is proposed to keep the road at a lower level (6.5m AOD) to ensure that a route is retained through the Site for the conveyance of floodwaters. It is noted that during the Q1000 event, peak flood velocities and depths along Sanatorium Road and Lansdowne Road will not satisfy the criteria set out in TAN 15. Therefore, it is concluded that raising the access road within the Site boundary to comply with TAN 15 will provide little benefit as access off-site cannot be made compliant with TAN 15 criteria. It is considered more important to retain the conveyance route through the Site.

- We are not satisfied that the changes made to the NRW baseline model by Waterman have been fully quantified in respect of the differences in results. In undertaking a limited comparison, we have identified inconsistencies in modelling and have queries on the presentation of grids and certain structures in the model. Our view is that a consistent approach in modelling should be adopted throughout. We identify three main issues:
  1) Firstly we seek confirmation on the displacement of floodwater and any potential loss of flood storage;
The model is used to assess the impact of the proposed ground modifications on the wider floodplain. The Site is to be raised as part of future development. Therefore, the proposed ground modifications are primarily to provide compensatory storage for the area to be raised.

2) Secondly there is inconsistency in modelling approach with the use of raised finished floor levels to take into account the elevated level of the hospital. Elsewhere the finished floor level of properties has been disregarded. To achieve consistency in the approach there should be an allowance for raised floor levels (or ‘stubby buildings’) across the modelled study area or the current ‘bare earth’ approach retained. We suggest that the model outputs and assessment results could be sensitive to this change in approach.

In the technical annex supplied with the NRW comments, NRW agree that the raising of ground levels to represent the FFLs of the existing hospital building are ‘reasonable and creates a more realistic representation of existing ground levels and the availability of flood storage within the development Site’. However, it is then stated that this change is ‘inconsistent with the ‘bare earth’ approach adopted elsewhere within the model’. It is suggested that for a consistent and perhaps more ‘realistic’ approach, ‘stubby buildings’ should be used to adjust all FFLs for all buildings. It is noted that in the model information supplied by NRW, a number of scenarios were modelled including ‘Sensitivity Test 3 (ST03): Increasing the Building Footprint Level’. This raised all building slab levels by 0.3m. ST03 was only modelled for the Q100 event, without climate change applied to the downstream tidal boundary. However, a comparison between the baseline Q100 model outputs and the ST03 scenario, as provided by NRW, did not indicate that the model was particularly ‘sensitive’ to the modelling approach at the area of interest. I disagree with the assertion that by raising the Lansdowne Hospital Site to the surveyed threshold level is ‘inconsistent’ as the hospital is an unusual instance where the slab is some 1m higher than ground levels. It has only been raised so that the storage capacity of the Site is not overestimated- which NRW agree is not unreasonable. If the model was to assume the ‘bare earth’ approach and remain ‘consistent’, then the Site would have an additional area of 1722m2 for floodplain storage, which is definitely not the case. As the main thrust of the modelling work was to identify potential third party impacts and flood levels at the Site, it was not considered necessary to consider all buildings within Cardiff and the model domain.

3) Third, we require confirmation that amended bridge opening details are correct, if not these details should be amended accordingly.

The main reason for amending the ‘bridge’ openings beneath the raised railway embankments was that the model was giving some very odd off-site impacts when the proposed development was incorporated into the model. It was considered that these impacts, which were appearing a considerable distance from the Site of interest, were not very realistic. It seemed that very minor changes to the flood levels was magnified by the ‘bridge’ structures which linked the separate cells within the floodplain which are intersected by the railway. In reality, it was considered that the underpasses would not act like bridge structures, instead they would simply act to channel flow in a certain direction rather than ‘constrict’ flow. Especially seeing as peak flood depths at the underpasses are typically 0.1-0.6m and therefore nowhere near the ‘soffit’ of the underpass structures. So I have simply used a z-shape which interpolates ground levels between each side of the underpass to create a flow path through the embankment. The intention was to simply retain the flow paths between each flood ‘cell’. This approach is no more correct or incorrect than the assumption that the underpasses are 1d bridge structures linked to the 2d domain using sx links as in the NRW model. Indeed the ground level interpolation in the WIE
approach uses the same LiDAR/DTM data to assign ground levels as the NRW model to assign ground levels at the 1d/2d link. Furthermore, NRW note that the updated model reduces the bridge opening from 15m to 8m wide for the bridge near to the Site as part of the amended approach. OS Mastermap data indicates that the road/underpass is approx. 9m wide (see image below). This tallies with a typical lane width for a UK road of 3.5 metres, with a 1m wide pavement on each side. Therefore, 8m width is considered appropriate.

Although we seek clarity in regard to the model and the work involved is not perceived as onerous by us, the proposer should be aware that this work may make the situation better, worse, or the same. The results may still show that the access road and open space are at risk from flooding and we may maintain our NRW position in not supporting the allocation.

This letter has sought to confirm that the area referred to as 'Public Open Space' will remain undeveloped and will therefore be reclassified as a 'Flood Compensatory Area'. This will ensure that the function of the area will remain known, and the purpose of the area is to provide compensatory storage during an extreme flood event. In addition, it is clear that off-site access routes (Sanatorium Road; Lansdowne Road) cannot be made compliant with TAN 15 criteria in terms of peak flood depths and velocities during the 0.1% APE. It is therefore considered more appropriate to retain a conveyance route through the Site via the access road within the red line boundary, rather than raise the road to the same level as the development. Even if this access road does remain compliant with TAN 15, residents would still have to travel onto Sanatorium Road and/or Lansdowne Road which do not remain compliant with TAN 15.

Waterman have been asked to quantify the difference between their model results and the original NRW Baseline model. This was to allow us to determine whether a detailed review of the model was required. Apart from supplying a difference layer this assessment has not been carried out.

The difference layer was supplied to NRW for the Q100CC event, with CC applied to the downstream tidal boundary. This confirmed that the difference between the modelled peak levels in the NRW Baseline model and the WIR Baseline model was typically 10-20mm, with some larger differences over 1km north of the Site. It was considered that this difference was not significant in terms of modelled flood risk at the Site of interest and that the model outputs for the amended WIE Baseline model were appropriate for the assessment of flood risk at Lansdowne Hospital. The NRW response suggests that the changes have increased flood depths by 3cm within Victoria Park and wider area. However, the difference plot suggests that this difference is actually 3.5mm in Victoria Park. Depths are increased locally at the bridge openings, as suggested by the NRW response. However, this is due to the slightly different model approach, and if anything provides a conservative assessment as peak flood levels are slightly raised compared to the NRW model i.e WIE are predicting slightly higher flood levels within the immediate vicinity of the Site. The impact of the modelling approach at the bridge openings dissipates with distance from the underpasses suggesting that this is a localised effect.

I hope that the above clarifies the main issues raised in your letter of reply to Stuart Williams (Cardiff City Council). In summary, the 2 key issues appear to be access and the area of POS. This letter has confirmed that both of these aspects have been considered, and the flood risk has been judged as manageable and acceptable. By designating the area previously referred to as POS to a designated Flood Compensatory Area, then the requirements to keep this area flood-free are removed. Furthermore, the wider access routes for the Site cannot be made compliant with TAN 15 criteria. Therefore, it is considered that there is little gain in raising the access road within the Site to remain
compliant. It is considered that a site-specific FCA will assess the flood risk and develop an Emergency Flood Plan to ensure that flood risk at the Site can be managed appropriately. Therefore, I am confident that NRW will be able to lift their objection to the allocation of the Lansdowne Hospital Site, and support the future development of this brownfield site.

Please do not hesitate to contact me if you require any further information.

Yours sincerely,

Laura Clements
Senior Engineer
Waterman Infrastructure & Environment Ltd.
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<td>03000 65 3148</td>
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<tr>
<td>Email:</td>
<td>southeastplanning@cyfoethnatu</td>
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<tr>
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<td>riolcymru.gov.uk</td>
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Signed: Date: 23rd July 2015
PART 2: Commenting on Matters Arising Changes

Which Matters Arising Changes do you wish to comment on (Please refer to the Matters Arising Changes Schedule)

Matters Arising Changes References for Sustainability Appraisal - Support MAC5; MAC 22 and PM4; and MAC69 and PM18

If you are objecting to a change it would be helpful if you could indicate which Test of Soundness you consider it to fails (Please refer to guidance note).

Please note if you do not identify a test it will not mean your comments will not be considered.

PART 3: Your Response

Your comments should be set out in full and relate to the Matters Arising Changes only.

Please use the space provided to set out your representation. Please be explicit as to which ‘matters arising change’ your comments relate to.

(Continue on a separate sheet/expand box if necessary)

HRA, MAC8, Policy KP6: New Infrastructure
We are supportive of the matters arising changes to Policy KP6 and reasoned justification. While we note the reference to NRW in the screening criteria section our view is that we would agree that new development should make appropriate provision for any necessary infrastructure, including a range of flood mitigation measures. Prior to agreeing such provision, we would direct developers to Planning Policy Wales and Technical Advice Note 15 Development and Flood Risk, which explains that;

- In meeting the Assembly Government’s objectives for sustainable development action is required through the planning system to move away from flood defence and the mitigation of the consequences of new development in areas of flood hazard towards a more positive avoidance of development in areas defined as being of flood hazard.
- The risks and consequences of flooding must be assessed over the lifetime of development, in consideration of climate change factors.
- In accordance with Planning Policy Wales, development proposals should seek to reduce, and certainly not increase, flood risk arising either from river and/or coastal flooding or from additional run-off from development in any location.
- In accordance with Planning Policy Wales, local planning authorities should recognise when assessing development proposals located within areas of flood hazard that the development is still at risk from flooding which may threaten human life and cause substantial damage to property, even where mitigation measures are proposed. Therefore risks can only be alleviated rather than fully protected.
- In accordance with Planning Policy Wales, when drawing up policies and proposals for their area local planning authorities must acknowledge that government resources for flood and coastal defence projects are directed at protecting ‘existing’ developments and are not available to provide defences in anticipation of future development.
HRA, MAC23, Policy H8 Sites for Gypsy and Traveller Caravans, paragraphs 5.52-5.53
HRA, MAC25, New Policy, EC& employment proposals on Land not identified for Employment Use
HRA, MAC38, Policy T2, Strategic Rapid Transit and Bus Corridors
HRA, MAC39, Policy T9, Cardiff City Region Metro Network
HRA, MAC59, New Policy C7, Planning for Schools
HRA, MAC70, Policy W2, Sites for Waste Management Facilities (amended)
We would agree with the comments provided on the HRA screening criteria in that where individual sites come forward in the future then these development sites will be subject of Habitats Regulations Assessment (HRA) at the project appraisal level.
PART 4: What Happens Next?

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4a) Do you want your comments to be considered by ‘written representations’ or do you want to speak at a hearing session?

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I do not want to speak at a hearing session and am happy for my written comments to be considered by the Inspector. ✓

I do want to speak at a hearing session.

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The Matters Arising Changes Schedule is available on the Council website at: www.cardiff.gov.uk. Hard copies are also available for public inspection during the consultation period at: City Hall, Cathays Park and County Hall, Atlantic Wharf, Monday to Friday between 9.00am and 4.00pm. They will also be made available at all local libraries.

Additional Assistance

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LDP Team,
Strategic Planning – Policy
Cardiff Council
Room 131
City Hall
Cathays Park
Cardiff
CF10 3ND
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Matters Arising Changes Representation Form

As part of the Examination into the Cardiff Local Development Plan (LDP) a number of Matters Arising Changes have been proposed to the LDP. These changes are set out in the Matters Arising Changes Schedule. This is your opportunity to comment on the Matters Arising Changes. All comments previously made at Deposit stage have already been considered by the Inspectors and so this form should only be used to comment on the Matters Arising Changes.

All completed forms should be returned by midnight on 23rd July 2015 to: LDP Team, Room 131, City Hall, Cardiff, CF10 3ND, or email LDP@Cardiff.gov.uk

Also available for comment are the Sustainability Appraisal and Habitats Regulations Assessment of the Matters Arising Changes at www.cardiff.gov.uk.

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<tr>
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<tbody>
<tr>
<td>Title: Development Planning Team</td>
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<tr>
<td>Name:</td>
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<tr>
<td>Job title: <em>(where relevant)</em></td>
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<tr>
<td>Organisation: <em>(where relevant)</em> Natural Resources Wales</td>
<td></td>
</tr>
<tr>
<td>Address: Rivers House St Mellons Business Park Fortran Road Cardiff CF3 0EY</td>
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(Continue on a separate sheet/expand box if necessary)
NRW supports the following Material Arising Changes to the Deposit Plan;

SA, MAC5, Add policies for strategic sites to KP2 (KP2 A-H)
NRW supports the proposed change to the Sustainability Appraisal (SA) include wording ‘no detriment to the maintenance if favourable conservation status.’ We refer you to our views on strategic site policies KP2 A-H.

SA, MAC 22 and PM4, Delete Gypsy / Traveller Site Policy
NRW supports the proposed change to the Sustainability Appraisal (SA) to delete the appraisal because policy H7 has been removed from the deposit plan.

SA, MAC69 and PM18, Delete Lamby Waste Site Allocation
NRW supports the proposed change to the Sustainability Appraisal (SA).
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Natural Resources Wales detailed advice and comments in response the letter from Waterman Group of 8th July 2015 (ref. C 16859 150708 LC L).

Please find our detailed advice and comments, highlighted in bold, in response the letter from Waterman Group of 8th July 2015 (ref. C 16859 150708 LC L). The response from Waterman Group is shown in italics (8th July 2015) and NRW previous comments are shown in underlined italics (18th June 2015).

1. While the results show the buildings for the residential flats will be designed flood free, the immediate access road and public open space is not designed flood free.

Please note that the area designated as Public Open Space is to provide the flood compensatory area. This area will remain undeveloped. Therefore, when the final Site Masterplan is formulated, this area will be designated as 'Flood Compensatory Area' and will not be an area of Public Open Space. Based on this, it is assumed that the requirement for the space to remain flood-free is no longer applicable. As a Flood Compensatory Area, the area has to accommodate floodwaters as part of its function.

NRW: The ‘Flood Compensatory Area’ must be annotated on any future plans for clarity and must remain undeveloped over the development lifetime.

2. In summary, Maximum flood depths along the access road are only slightly lower than those within the public open space and these depths alone are considered to have a hazard rating of ‘Danger for Most’. Our view therefore is that the development is not designed in accordance with the requirements of A1.14 and A1.15 for these elements of the development.

The proposed Site layout indicates the access road will run along the southern boundary. It is proposed to keep the road at a lower level (6.5m AOD) to ensure that a route is retained through the Site for the conveyance of floodwaters. It is noted that during the Q1000 event, peak flood velocities and depths along Sanatorium Road and Lansdowne Road will not satisfy the criteria set out in TAN 15. Therefore, it is concluded that raising the access road within the Site boundary to comply with TAN 15 will provide little benefit as access off-site cannot be made compliant with TAN 15 criteria. It is considered more important to retain the conveyance route through the Site.

NRW: We agree with the importance of maintaining a flood conveyance route. However, we consider that the development itself remains non compliant with the requirements of in A1.14 and A1.15 TAN 15 for the proposed access. Our view has not altered and we do not support the allocation of H1.4 in the Local Development Plan. The existing access/infrastructure off-site being non-compliant with A1.15 of TAN 15 does not mean that a new development should
be subject to the same flood risk under the precautionary framework in this planning policy guidance.

3. **Firstly we seek confirmation on the displacement of floodwater and any potential loss of flood storage**

The model is used to assess the impact of the proposed ground modifications on the wider floodplain. The Site is to be raised as part of future development. Therefore, the proposed ground modifications are primarily to provide compensatory storage for the area to be raised.

**NRW:** We note your comments, which confirm that compensatory storage is being provided for the area of flood plain lost (although the response does not specify whether there is an exact like for like replacement).

4. **Secondly here is inconsistency in modelling approach with the use of raised finished floor levels to take into account the elevated level of the hospital. Elsewhere the finished floor level of properties has been disregarded. To achieve consistency in the approach there should be an allowance for raised floor levels (or ‘stubby buildings’) across the modelled study area or the current ‘bare earth’ approach retained. We suggest that the model outputs and assessment results could be sensitive to this change in approach.**

In the technical annex supplied with the NRW comments, NRW agree that the raising of ground levels to represent the FFLs of the existing hospital building are ‘reasonable and creates a more realistic representation of existing ground levels and the availability of flood storage within the development Site’. However, it is then stated that this change is ‘inconsistent with the ‘bare earth’ approach adopted elsewhere within the model’. It is suggested that for a consistent and perhaps more ‘realistic’ approach, ‘stubby buildings’ should be used to adjust all FFLs for all buildings. It is noted that in the model information supplied by NRW, a number of scenarios were modelled including ‘Sensitivity Test 3 (ST03): Increasing the Building Footprint Level’. This raised all building slab levels by 0.3m. ST03 was only modelled for the Q100 event, without climate change applied to the downstream tidal boundary. However, a comparison between the baseline Q100 model outputs and the ST03 scenario, as provided by NRW, did not indicate that the model was particularly ‘sensitive’ to the modelling approach at the area of interest. I disagree with the assertion that by raising the Lansdowne Hospital Site to the surveyed threshold level is ‘inconsistent’ as the hospital is an unusual instance where the slab is some 1m higher than ground levels. It has only been raised so that the storage capacity of the Site is not overestimated- which NRW agree is not unreasonable. If the model was to assume the ‘bare earth’ approach and remain ‘consistent’, then the Site would have an additional area of 1722m² for floodplain storage, which is definitely not the case. As the main thrust of the modelling work was to identify potential third party impacts and flood levels at the Site, it was not considered necessary to consider all buildings within Cardiff and the model domain.
NRW: We note your response. Figure 6.9 of the Cardiff VDM Update Report (Mott MacDonald 2013) indicates that the Q100 flood extents are potentially sensitive to the representation of buildings within the hydraulic model. This Figure is replicated below for information and shows reduced flood extents in Victoria Park but greater extents (identified in pink) to the former Ely Paper Mill site and to a lesser extent at Leckwith Playing Fields.

![Map of Cardiff with flood extents highlighted]

Figure 1: Q100 Flood Extents: bare earth approach in dark blue, ‘stubby building’ approach in pink

As set out previously the scope of NRW’s model is to identify areas potentially at risk of flooding within the broader Cardiff area and that this should be reviewed and updated (as appropriate) as part of more detailed, local assessments. The changes to the Finished Floor Level at Lansdowne Hospital can be viewed as one of these local improvements. However, an assessment of whether similar changes should be applied to other buildings should also be made (to ensure flood risk at the site is appropriately identified). This justification has not been provided in Waterman’s response.

Again, we see no reason why this issue cannot be resolved and therefore should not distract from the over-riding policy concerns set out in Points 2 and 6.
5. Third, we require confirmation that amended bridge opening details are correct, if not these details should be amended accordingly.

The main reason for amending the 'bridge' openings beneath the raised railway embankments was that the model was giving some very odd off-site impacts when the proposed development was incorporated into the model. It was considered that these impacts, which were appearing a considerable distance from the Site of interest, were not very realistic. It seemed that very minor changes to the flood levels was magnified by the 'bridge' structures which linked the separate cells within the floodplain which are intersected by the railway. In reality, it was considered that the underpasses would not act like bridge structures, instead they would simply act to channel flow in a certain direction rather than 'constrict' flow. Especially seeing as peak flood depths at the underpasses are typically 0.1-0.6m and therefore nowhere near the 'soffit' of the underpass structures. So I have simply used a z-shape which interpolates ground levels between each side of the underpass to create a flow path through the embankment. The intention was to simply retain the flow paths between each flood 'cell'. This approach is no more correct or incorrect than the assumption that the underpasses are 1d bridge structures linked to the 2d domain using sx links as in the NRW model. Indeed the ground level interpolation in the WIE approach uses the same LIDAR/DTM data to assign ground levels as the NRW model to assign ground levels at the 1d/2d link.

Furthermore, NRW note that the updated model reduces the bridge opening from 15m to 8m wide for the bridge near to the Site as part of the amended approach. OS Mastermap data indicates that the road/underpass is approx. 9m wide (see image below). This tallies with a typical lane width for a UK road of 3.5 metres, with a 1m wide pavement on each side. Therefore, 8m width is considered appropriate.

NRW: Your comments are noted by us.

6. Although we seek clarity in regard to the model and the work involved is not perceived as onerous by us, the proposer should be aware that this work may make the situation better, worse, or the same. The results may still show that the access road and open space are at risk from flooding and we may maintain our NRW position in not supporting the allocation.

This letter has sought to confirm that the area referred to as 'Public Open Space' will remain undeveloped and will therefore be reclassified as a 'Flood Compensatory Area'. This will ensure that the function of the area will remain known, and the purpose of the area is to provide compensatory storage during an extreme flood event. In addition, it is clear that off-site access routes (Sanatorium Road; Lansdowne Road) cannot be made compliant with TAN 15 criteria in terms of peak flood depths and velocities during the 0.1% APE. It is therefore considered more appropriate to retain a conveyance route through the Site via the access road within the red line boundary, rather than raise the road to the same level as the development. Even if this access road does remain compliant with TAN 15, residents would still have to travel onto Sanatorium Road and/or Lansdowne Road which do not remain compliant with TAN 15.
NRW: We refer to our comments in our letter under items (1) and (2).

7. Waterman have been asked to quantify the difference between their model results and the original NRW Baseline model. This was to allow us to determine whether a detailed review of the model was required. Apart from supplying a difference layer this assessment has not been carried out.

The difference layer was supplied to NRW for the Q100CC event, with CC applied to the downstream tidal boundary. This confirmed that the difference between the modelled peak levels in the NRW Baseline model and the WIR Baseline model was typically 10-20mm, with some larger differences over 1km north of the Site. It was considered that this difference was not significant in terms of modelled flood risk at the Site of interest and that the model outputs for the amended WIE Baseline model were appropriate for the assessment of flood risk at Lansdowne Hospital. The NRW response suggests that the changes have increased flood depths by 3cm within Victoria Park and wider area. However, the difference plot suggests that this difference is actually 3.5mm in Victoria Park. Depths are increased locally at the bridge openings, as suggested by the NRW response. However, this is due to the slightly different model approach, and if anything provides a conservative assessment as peak flood levels are slightly raised compared to the NRW model i.e WIE are predicting slightly higher flood levels within the immediate vicinity of the Site. The impact of the modelling approach at the bridge openings dissipates with distance from the underpasses suggesting that this is a localised effect.

This comment was raised as a request for Waterman to quantify the differences between NRW's baseline model and Waterman's updated version. Following Waterman's response we have re-checked the differences between the two models and there does appear to be the differences quoted in our previous response and as illustrated below.
Figure 2: Comparison of flood depths (sample flood depths provided at a point in Victoria Park)

Please Note: Grid data annotated with ‘WTD’ represents Waterman’s model results for a given return period.

As indicated by Waterman the updated model does appear to be generating slightly elevated flood depths on the Victoria Park (or ‘upstream’) side or the railway opening in the Q1000 but is generating slightly lower flood depths on the ‘downstream’ Lansdowne Hospital side of the opening.

These differences are relatively small suggesting that the changes in bridge modelling approach are not fundamentally changing the outcome of the study. If necessary these differences can be investigated further as part of a detailed Flood Consequence Assessment but again should not distract from the over-riding policy concerns set out in Points 2 and 6 above.