

Comments re Impact Assessment of HS2 Tunnel on Piles and Superstructure. Ref: 2018/1098/P 100 Avenue Road

Janine Sachs. Chair SAVE SWISS COTTAGE. 22 March 2018

The two main objectives of this Impact Assessment are to assess:

1)... **“the construction methodology to be implemented onsite in order to eliminate any impact that the development and construction process may pose on the HS2 network”**. [1.0 Introduction. SC-HS2 Impact Assessment-R-RBP P03]

2) ...**“the risks of damage to the superstructure due to potential differential settlement of individual piles caused by the tunnelling movement (i.e. the effects of pile downdrag)”**. [1.1 Objectives. SC-HS2 Impact Assessment-R-RBP P03]

Therefore my comments (in italics) will relate to how the combined construction/operation of HS2 and the 100 Avenue Road development (superstructure) will impact on each other. (References to the report are in blue and Condition 17 are in blue italics)

1.0 Introduction [SC-HS2 Impact Assessment-R-RBP P03]

“The report concluded that all of the building facades fell under Damage Category 0 (negligible).”

- *This is according to an interpretation of the Burland et al. Table 1 in the AECOM report where the ‘Limiting Tensile Strain’ of ‘0.0- 0.05’ corresponds to an “approximate crack width of <0.1mm”. However looking closely at the AECOM Oasys Second Stage Assessment the ‘Limiting Tensile Strain’ is ‘0.10000’ which corresponds to an “approximate crack width of 5mm”, which is in Category 2/Slight, and NOT in Category 0/ Negligible. Is this an error? If not this apparent discrepancy needs to be accounted for. [See Appendix A]*
- *Given how much store the developers set by this measurement it is also important to note that the Burland Table makes it clear that “**Crack width is only one aspect of damage and should not be used on its own as a direct measure of it.” [See Appendix A]*

“However the report did not consider the effects of **pile downdrag**, which is the additional settlement of the piles relative to the soil due to the local ground movement near the tunnels. AECOM acknowledged that greater settlement would occur as a result of this downdrag, and they recommended that the effects of pile downdrag be considered in the next stage of assessment.”

- Surely the effects of pile downdrag need to be considered at this stage - before discharge and commencement - to assess "the risks of damage to the superstructure due to potential differential settlement of individual piles caused by the tunnelling movement (i.e. the effects of pile downdrag)". [1.1]?
- And since the effects of pile downdrag relate to ground movement - would this assessment not be needed at this stage in order to comply with the second bullet point of **condition 17**, which requires "detailed design and construction method statements that shall: **Accommodate ground movement** and associated effects arising from the construction thereof.."?

2.0 Ground Conditions [SC-HS2 Impact Assessment-R-RBP P03]

"The depth of the London Clay stratum was not proven. Table 2.1 presents the ground model derived by AECOM: * Base not proven in site investigation."

- Should not this information be submitted at this stage, before discharge and commencement - in accordance with AECOM's Geotechnical Interpretive Report (Ref: LORP0023, 2016) objective "to assess the ground conditions at the site and produce geotechnical parameters for the preliminary design of the building and a ground impact assessment"? And most importantly, in accordance with condition 17?
- Have any tests of the depth of the boreholes been carried out, if so where is this information? If not how can the impact to HS2 be assessed?

4.0 Pile Geometry [SC-HS2 Impact Assessment-R-RBP P03]

"A line of proposed piles are located south of the site where the HS2 tunnels safeguarded zone is located. For this impact assessment, a pile length of 41 m bgl will be assumed for the piles in the area of the proposed tunnel."

- Should not pile length be established at this stage?

5.2. Assessment Inputs [SC-HS2 Impact Assessment-R-RBP P03]

"The following **assumptions** have been considered in the Impact Assessment re: • Ground level • HS2 tunnel diameter • Depth of the tunnel axis • Pile length."

- Can '**assumptions**' of this magnitude be congruent with the specific requirements of condition 17 for: "detailed design and construction method statements for all of the ground floor structures, foundations and basements and for any structures below ground level, including piling (temporary and permanent)"?

7.0 Noise and Vibration [SC-HS2 Impact Assessment-R-RBP P03]

“The Hann Tucker Associates...noise and vibration assessment for the Swiss Cottage development...concluded that ground borne noise and vibration from the operation of the HS2 tunnels would not likely impact the Swiss Cottage development. A further analysis should be undertaken once HS2 provides site specific noise and vibration data.”

- *Where is Hann Tucker’s “noise and vibration assessment”?*
- *If “**HS2 Site specific** noise & vibration data” is not provided at **this** stage how can **condition 17** be discharged requiring “detailed design and construction method statements that shall: **Mitigate the effects of noise and vibration arising from the operation of the HS2 railway within the tunnels**”?*
- *In his response to this Impact Assessment, Safeguarding Planning Manager James Fox from HS2 Ltd writes: “...a consultant has also considered the noise and vibration impacts”, but consideration based on no information does not satisfy condition 17,*

Changes to HS2 condition wording

Because this condition was requested by HS2 for their own protection does not justify flouting the specific requirements of that condition - as applied by the Inspector and the Secretary of State - for reasons of expediency.

In this regard it needs to be clarified how the wording of HS2’s original condition submitted to Camden Council on 08.04.2014 got changed by the developers (as in bold) from:

“(i) **None** of the development hereby permitted shall be commenced on those parts of the site shown on the site as shown as falling within the ‘Limits of Land Subject to the Safeguarding Direction’ until detailed design and* construction method statements for all of the ground floor structures, foundations and basements and for any structures below ground level, including piling (temporary and permanent) have been submitted to and approved in writing by the Local Planning Authority which: / (These shall:)

- Accommodate the proposed location of the HS2 structures and tunnels.
- Accommodate ground movement and associated effects arising from the construction thereof, and;
- Mitigate the effects of noise and vibration arising from the operation of the HS2 railway within the tunnels, ventilation shaft and associated below and above ground structures.

(ii) The design and construction method statements to be submitted under part (i) shall include arrangements to secure that, during any period when concurrent construction is taking place of both the development hereby permitted and of the HS2 structures and tunnels in or adjacent to the site of that development, the construction of the HS2 structures and tunnels is not impeded. The development shall be carried out in all respects in accordance with the approved design and method statement and all structures and works comprised within the development hereby permitted which are required by the approved design statements in order to procure the matters mentioned in part (i) shall be completed, in their entirety, before any part of the building(s) hereby permitted is/are occupied.

(iii) No works below ground level comprised within the development hereby permitted shall be carried out at any time when a tunnel boring machine used for the purposes of boring tunnels for the HS2 Ltd railway is within 100 metres of the land on which the development hereby permitted is situated”

to:

“(i) **Works below ground level shall not start** until detailed design and *(....as above...”

such that the meaning and timing of that condition has changed from discharging it after demolition instead of before.

It would appear from the correspondence between HS2 and the developers [FOI17-1846] that HS2 were not informed of this change of wording prior to or during the Inspector’s Inquiry which established condition ‘17’. A formal statement from HS2, Camden Council and EL is needed to confirm that they are in agreement with this change of wording, and by the same token are content for the building to be demolished before it is certain that construction may safely proceed.

Conclusion

It is not helpful/acceptable that most of the diagrams in the O’Keefe report of this Impact Assessment are illegible due to being presented in low resolution. Whilst it is patently assumed that the public are not technically minded enough to understand these technical drawings in any event, it would appear that neither are they intended for LBC officers’ serious assessment - otherwise they would be legible.

By the same token one wonders why Robert Bird Group is using drawings of the existing building when this impact assessment is clearly only concerned with the new building. The diagram showing piling positions for the area of the

building in the safeguarding zone [4045-PSK-G-00I-] is not relevant for the old building which has no basement in that section.

Why do the 6 AECOM /Oasys drawings: 6046927 show HS2 tunnels going directly under the middle of Block B when it has been established that they will go at or just beyond the southern edge of Block B and within the safeguarding zone?

If the tunnels were to go directly under Block B then this entire Impact Assessment would also have to incorporate Block A - the tower block - regarding piling, ground movement, noise mitigation etc.

This confusing presentation does not inspire confidence or credibility in the integrity of this Impact Assessment where the safety of the new 100 Avenue Road building and the nearby HS2 tunnels is at stake.

Moreover, according to this Impact Assessment the 3 requirements of condition 17 have not yet been met because this report does not:

- *Accommodate the proposed location of the HS2 structures and tunnels.*
(HS2 acknowledge that this location has not yet been established.)
- *Accommodate ground movement and associated effects arising from the construction thereof,*
(‘Downpile drag’, which effects ground movement, has not yet been assessed, and ‘Damage Category’ is in question.)
- *Mitigate the effects of noise and vibration arising from the operation of the HS2 railway within the tunnels, ventilation shaft and associated below & above ground structures.*
(Site specific noise and vibration data from HS2 Has not yet been provided.)

Even "The objective of this Impact Assessment...to assess the risks of damage to the superstructure due to potential differential settlement of individual piles caused by the tunneling movement (i.e. the effects of pile downdrag)" [1.1] has **not** been met because it is also acknowledged that "the report did not consider the effects of pile downdrag. AECOM acknowledged that greater settlement would occur as a result of this downdrag, and they recommended that the effects of pile downdrag be considered in the next stage of assessment. " [1.0]

In addition, according to this report, much of the requested "detailed design" is still wanting pending more information from HS2.

For these reasons this application to discharge condition 17 should not be approved.

Appendix A - Damage Category Diagrams from Impact Assessment.

[AECOM: Technical note 4. / Oasys Second Stage Assessment]

Table 1: Classification of visible damage to walls (after Burland et al., 1977, Boscardin and Cording, 1989)

Damage category*	Description of degree of damage*	Description of typical damage and likely forms of repair for typical masonry buildings.	Approx. crack width (mm)**	Limiting tensile strain (%)
0	Negligible	Hairline cracks.	<0.1	0.0- 0.05
1	Very slight	Fine cracks easily treated during normal redecoration. Perhaps isolated slight fracture in building. Cracks in exterior visible upon close inspection.	1.0	0.05 to 0.075
2	Slight	Cracks easily filled. Redecoration probably required. Several slight fractures inside building. Exterior cracks visible; some repainting may be required for weather-tightness. Doors and windows may stick slightly.	5	0.075 to 0.15
3	Moderate	Cracks may require cutting out and patching. Recurrent cracks can be masked by suitable linings. Tuck pointing and possible replacement of a small amount of exterior brickwork may be required. Doors and windows sticking. Utility services may be interrupted. Weather tightness often impaired.	5 to 15 or a number of cracks > 3	0.15 to 0.3
4	Severe	Extensive repair required involving removal and replacement of walls especially over doors and windows. Window and door frames distorted. Floor slopes noticeably. Walls lean or bulge noticeably. Some loss of bearing in beams. Utility services disrupted.	15 to 25 but also depends on number of cracks	> 0.3
5	Very severe	Major repair required involving partial or complete reconstruction. Beams lose bearing, walls lean badly and require shoring. Windows broken by distortion. Danger of instability.	Usually > 25 but depends on number of cracks	

*In assessing the degree of damage, account must be taken of its location in the building or structure
 **Crack width is only one aspect of damage and should not be used on its own as a direct measure of it.

Damage Category Strains									
Name	0 (Negligible)	1 (Very Slight)	2 (Slight)	3 (Moderate)					
	to	to	to	to					
Burland Strain Limits	1 (Very Slight)	2 (Slight)	3 (Moderate)	4 (Severe)					
	0.0	500.00E-6	750.00E-6	0.0015000					

Specific Structures - Geometry									
Structure Name	Sub-Structure Name	Displacement Line	Start Distance Along Line	End Distance Along Line	Vertical Offsets from Line for Vertical Movement Calculations	Vertical Displacement Limit Sensitivity	Damage Category Strains	Poisson's Ratio	E/G
			[m]	[m]	[m]	[mm]			
Tower Facade N		N1	0.00000	21.34400	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Tower Facade S	Sub #	S1	0.00000	21.34400	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Tower Facade E	Sub 3	E1	0.00000	26.59895	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Tower Facade W	Sub 4	W1	0.00000	26.59895	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Lower Block Facade N	Sub #	N2	0.00000	64.55261	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Lower Block Facade S	Sub #	S2	0.00000	64.55261	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Lower Block Facade E1	Sub #	E2	0.00000	12.31698	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Lower Block Facade W1	Sub #	W2	0.00000	12.31698	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Lower Block Facade Eh	Sub #	E2	12.31698	24.63395	0.0	0.10000	Burland Strain Limits	0.25000	12.500
Lower Block Facade Wb	Sub #	W2	12.31698	24.63395	0.0	0.10000	Burland Strain Limits	0.25000	12.500