Lye Valley: The Made-ground Bank to the east of the Warren Meadow off Warren Crescent.

A study for Friends of Lye Valley (FoLV)

J A Webb, February 2021

(all photos by JW)

Introduction

The history of the treatment of the head of the Lye Valley is not a happy one. Locals in the '60s and '70s used to call it 'the Pit' or 'the Dump' with good reason. A lot happened before any part of the valley received recognition for its wildlife value and any protective conservation designation. On the west side of the valley, the construction of the Town Furze housing estate in mid 1950s by Oxford City Council was followed by the council allowing many trucks visiting the area off the bend of Warren Crescent to dump building waste soil and other material down the shallow natural slope, building it up and levelling it off to form the area now known locally as Warren Meadow; now with an artificial very steep slope down into the valley.

The '**made ground'** underlying Warren Meadow green space off Warren Crescent is a term for dumped builder's waste, which forms a '**tipped embankment'** down into the Lye Valley upper fen area, part of a Local Wildlife Site and Local Nature Reserve owned by Oxford City Council. The material is presumed to have been deposited sometime during or after the building of the adjacent Town Furze housing estate, i.e. late 1950s to early 1960s. It is very variable in composition, but predominantly clay, with some sand, limestone lumps, brick, concrete, glass, metal and bitumen. 10 houses are planned to be built on Warren Meadow (application **13/01555/CT3*).*** Under the proposed development the made ground varies from under 1m deep adjacent to the Warren Crescent road, to 6m deep in other areas (source borehole records in documents associated with the Warren Crescent 10-house development and historic British Geological Society borehole data from 1973). This dumped material buries the natural geology of Beckley Sands gentle valley side slope and the **natural spring-line** and historic fen peat on the west side of the Lye Valley here. Water from the springs runs out from under the material in several areas. The slope angle of the 'cliff' of dumped material down into the valley varies from 32 degrees to a very steep 42 degrees, measured for Friends of Lye Valley (FoLV) by Curt Lamberth in August 2018. **On the steepest areas it is almost impossible to stand upright on that slope**. A safe slope angle for such deposited material in engineering terms is about 22 degrees. See the accompanying map. This shows our recent observations of the bank extent drawn on the 10 house development design document produced by Peter Brett Associates.

Curt Lamberth surveys Warren Meadow embankment slope angle from the valley with help from FoLV volunteers on 01.08.2018. Photo Tony Gillie

Survey and Photographs of various regions of the bank in Jan 2021, with explanations

Here follows a sequence of photos taken on 27.01.2021 from the boardwalk bridge walking north on the west bank of the brook up to the interception ponds By JW, with explanations of findings from an on-the-ground walkover. The shape of the land on the west side of the brook has become clearer with FoLV work in vegetation cutting and raking associated with fen restoration over the last few years. The bank is of course dry land on which we hope to encourage a range of dry- land flowers to benefit pollinators.

Photo 1. *View from Peat Moors footpath across the valley to the tipped embankment and existing houses on Warren Crescent visible through trees. 21.01.2021*

Below the houses is a line of field maple trees (hedge 26) which was planted at the break of slope (cliff edge) on the top of the tipped embankment of made ground. The embankment has a growth of bushes and slopes down to green area of old fen peat below (now dry) above boardwalk path and Lye Brook.

The Warren Crescent 10 house development has a SUDS swale designed and it will go along a 50m stretch in the made ground area between those existing houses and the line of trees at the top of slope (see plan of development). The edge of the swale on current plans would seem to be within 3m of the break of slope (cliff edge).

***Photo 2**. A little further north, view from Peat Moors bank of a big historic made-ground slump down the bank below the Warren Meadow.*

This shows an old slump (landslip) A 40-50 yr old collapsing willow pollard is growing in the middle of it, presumably planted after the event, or surviving the event when it was a young tree. The slump extends all the way to the actual brook bank (where all the twigs and brash are next to boardwalk, see next photo as well). The clay and rubble material is covered in nettles, all historic original fen area on that side is buried and inaccessible - no fen restoration possible. This slump actually buries the line of a 22.5cm Thames Water sewer and an inspection hatch (Manhole no. 5904) which must be located just to the left of the collapsed willow (from map supplied to FoLV by Thames Water). Existing houses of Warren Crescent visible through trees at slope top. The headwall of the Swale will start at the point level with the nearest house beyond the trees.

Photo 3. *Because the slump is not clear in the above photograph 2, here it is again with the limits of the old slump area out lined in blue, about 30m extent alongside the brook margin,.*

The orange line indicates the base of the rest of the tipped bank extent above a zone of dry old fen next to the brook margin (indicated by all that brash). Because of the slumping, the majority of this slope is now a shallower (more stable) slope angle than the rest of the bank, except at the very top of the slope where there is a steep 'cliff' of material that did not move (above top of blue line). It is impossible to tell if there was/is still a spring under this slumped area which might have been the cause of the material moving downslope.

Photo 4. *Further north, beyond cut willow pollards on the brook bank. In view is a big old multi-stemmed collapsing willow growing out from the base of the tipped bank*,

The large multi-stemmed collapsed willow might have been growing on the old spring line and survived partial burying by embankment material in the 1950s. A spring area is to its left (south) behind the pollard on the brook bank. Old fen is being restored below it in a narrow green strip (5-6m wide) on the other side of the brook. Note the Warren Crescent new housing will go on the green area above this section of bank beyond the trees at top. How far houses from the cliff edge? – from the plans, estimated 9 metres at nearest.

Photo 5. *Further north again, almost at the interception ponds (off to right of photo). Opposite the beginning of the boardwalk*.

Below the bank here on the far side of brook there is good spring flow with wet peat and several valuable tufa-forming springs emerging from below the base of the bank (junction of made ground with fen indicated by yellow line). This wet area is being targeted for fen restoration cutting by FoLV (scything, raking and seeding in a 9-12m wide section). Those two big crack willow trees growing out of the fen on the right will eventually be felled and their trunks used for a really big leaky dam at the outflow of the lowest interception pond. The tipped bank above is particularly steep here – above this fen zone is where the 42 degrees slope angle was measured. Warren Crescent new housing will go above this section of the bank, maybe 20m back from the cliff edge.

Discussion

There will have been settlement and consolidation of the dumped material of the bank in the intervening 60+ years since it was deposited, especially considering it has a high clay content. Trees and vegetation on the bank will assist its stability, as roots will hold the soil together.

The tipped embankment future stability is relevant to the planned new 10 house development. How stable will it be with the weight of houses and disruption of digging for house foundations? The planned position of the swale is very close to the 'cliff' edge and line of trees. Excavation for the swale has to go down through all made ground for the base to be keyed into natural rock of Beckley Sands; to allow roof and paving water infiltration in order to supply the SSSI fen springs.

The house foundations will also need to be anchored on Beckley Sands, meaning digging down through up to 3 or more metres of made ground.

In many areas, the extent of the tipped embankment on the ground is much wider in this current study than that indicated on any of the 10-house development plans. In fairness the extent of the bank is outside the development site limit and would not be expected to be mapped accurately - the extent is probably taken from maps which will not represent recent surveys.

However what happens immediately outside the red line of the development site limit should have been a very important consideration on this site. Nowhere on any of these diagrams is there any indication that the red line to the south east is actually on the break of slope of made ground down into the valley – if you like the 'cliff edge'

This walk-over reveals the bank deposits extend much further down into the valley fen than is shown on any of the housing plans. The blinkered approach of considering only anything within the development site line is negligent. As the bank is made ground and very important to the house safety, a full study of its stability should have been part of the initial housing application.

An important fact is that the tipped embankment buries the natural spring line. This is obvious as water emerges in many areas from underneath the dumped material, still allowing the survival of relic fen areas. Where there is water flow down a slope under dumped material, the flow can act as a lubricant to result in material on top sliding downslope , a landslip.

My survey identifies a historic slump/slide of material down the bank and all the way to the Lye Brook. This likely happened fairly soon after the tipping whilst material was loose. Since then it will have settled and consolidated. The large willow tree growing out of it indicates it happened a long time ago. Likely the trees of hedge 26 were planted in the 1970s when much dumped (fly tipped) material was removed from the valley and a fence erected at the edge of the slope to stop any more of such activity. That makes the biggest of the trees (field maples) in that hedge 40+ years old. Their roots will be holding the top of the bank at the edge together, other trees and bushes on the slope will assist in stability.

This historic slumped area was not identified in a bank walk-over by the firm Geotechnical Engineering for the housing contractors R.J. Leighfields in a recent commissioned study of ground stability in the made ground. Whilst an old feature, it does demonstrate that a landslip can occur with the 8m depth of made ground at the east edge of the development site.

Geotechnical Engineering did not comment on the likely effect of the construction of the long soakaway (swale) approximately 3m from the break of slope of the bank (cliff edge) but they did comment that **Soakaways in connection with the houses were not recommended**. To preserve bank stability obviously no swale should be constructed.

My accompanying map of the current extent and shape of the made ground in the embankment and slumped area is indicative only. A more accurate topological survey is really needed to enable greater understanding of this important feature.

A full illustrated discussion is presented in the blog by Headington Heritage at

https://headingtonheritage.wordpress.com/lyevalleyruin/