

Appendix F

MINING TECHNICAL NOTE



Our Ref: 19-0698.07_LET_Leyland Green, Masterplan 210506

06 May 2021

Jonathan Hollingshead
Development Manager
J. Murphy & Sons Limited
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Highgate Road,
London
NW5 1TN
[REDACTED]

Dear Jonathan

Re. Leyland Green Masterplan

Further to our recent discussion, and the Concept Master Plan provided by yourselves, we have provided below a short overview of the scheme with respect to the historical coal mining legacy on Site.

Delta-Simons have previously provided a graphical summary of the coal mining constraints present across the Leyland Green Road Site (ref: Legacy Coal Mining Constraints Plan, Leyland Farm, Ashton-in-Makerfield, 19-0698.05, 13 Nov 2019). In summary; the Site is known to have the following constraints with respect to the coal mining legacy;

- ▲ Numerous (18 on or close to Site) former mine shafts and adits with only partial records relating to treatment of some of the shafts / adits.
- ▲ Several areas of known shallow mine workings. These areas are where the Coal Authority (CA) are aware of mine workings less than 30m below surface either as a result of abandonment plans in their archives or records from third party investigations.
- ▲ Several areas of probable / suspected shallow mine workings. These areas are inferred based on the CA's understanding of the geology, workability of seams, and notes on abandonment plans.
- ▲ Areas of known or probable shallow mine workings cover the majority of the Site.
- ▲ Several areas of open cast workings where coal was extracted from a surface pit and subsequently backfilled (likely with colliery overburden but potential for unknown fill materials to be incorporated).

Whilst the above represent potential development constraints, there are well-established and proven methodologies accepted by regulators and warranty providers which can be implemented to successfully facilitate developments. For example;

- ▲ Mine shafts/adits: Development can adopt a standoff appropriate to the local geology around the shaft and the shaft diameter. Locations and conditions of shafts/adits would be assessed as part of future site investigation works and appropriate mitigation implemented including grouting and/or capping if considered necessary with Coal Authority agreement. We note the current concept masterplan avoids development within close proximity to the shafts/adits.
- ▲ Known shallow workings would be assessed as part of intrusive investigations. If insufficient competent overburden was identified, remedial works including treatment via grout injection could be implemented to mitigate future potential ground instability issues.
- ▲ Areas of probable workings would be similarly assessed with similar remediation techniques adopted if required.

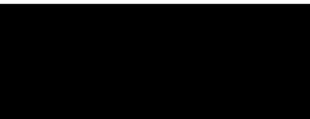
- ▲ Areas of open cast would require delineation to assess the location of the high wall and nature of the fill. The opencasts themselves do not preclude safe development but may require deepened foundations (e.g. piles) and/or incorporation of ground improvement/reengineering earthworks to mitigate future settlement issues. Foundations should be designed as to not span the high walls or potentially transfer loads to the face of the high wall. As such, exact layout of development within these areas will be subject to the findings of future investigation. We note the location of public open space in the northern most open cast and thus risks to future development from settlement in this open cast is minimal. At a more detailed design stage, layout alterations are likely to be refined around the southern three open cast areas to ensure compatibility with the site investigation findings.

In summary, whilst the Site presents a number of coal mining related constraints, none of these preclude safe and technically achievable development which would be acceptable to regulators, the Coal Authority and warranty providers.

We trust the above meets with your requirements.

Yours sincerely,

For Delta-Simons



Mike O'Halloran

Associate

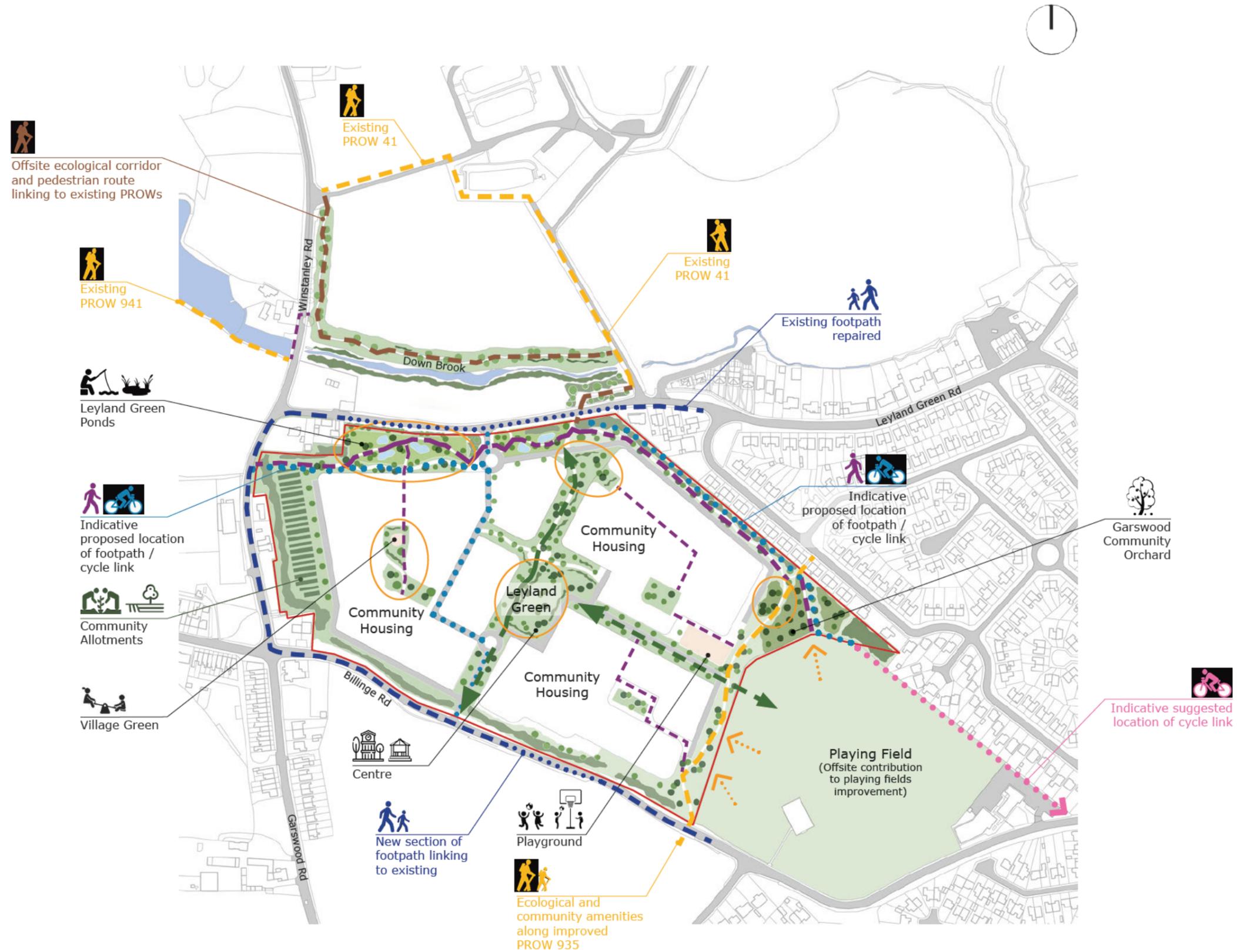


Attached; Murphy, *Leyland Green Road, Concept Master Plan 06.05.21*

Delta Simons, *Legacy Coal Mining Constraints Plan, Leyland Farm, Ashton-in-Makerfield, 19-0698.05, 13 Nov 2019*

Leyland Green Road

Concept Masterplan



Mine Entry Data						
Entry Type	Reference No.	Grid Reference		Treatment Description	Assumed Diameter (m)	Depth (m bgl)
		Eastings	Northings			
Shaft	354400-001	354940	400390	Filled to unknown specification.	2.5	49
Shaft	354400-002	354963	400391	Filled to unknown specification.	3	55
Shaft	355400-007	355449	400262	Untreated	3	33
Shaft	355400-013	355516	400184	Untreated	2.5	33
Shaft	355400-001	355078	400380	Untreated	3	N/A
Shaft	355400-002	355131	400381	Untreated	2.5	10
Shaft	355400-003	355177	400391	Filled to unknown specification. Shaft fenced off. Fill material sunk due to dewatering operations.	2.4	40
Shaft	355400-004	355232	400394	Filled to unknown specification. Shaft fenced off. Fill material sunk due to dewatering operations.	2.7	50
Shaft	355400-008	355241	400453	Filled to unknown specification.	3	N/A
Shaft	355400-016	355647	400662	Untreated	3	N/A
Shaft	355400-017	355646	400640	Untreated	3	N/A
Shaft	355400-018	355646	400635	Untreated	3	N/A
Adit	354400-015	354934	400564	Adit fenced, inspected in 2003.	2	N/A
Adit	355400-009	355230	400651	Adit sealed over. Collapse reported in 2012. Concrete plug (40 tonnes) installed and adit secured.	3	N/A
Adit	355400-012	355209	400621	Adit sealed on behalf of the Coal Authority	3	N/A
Adit	355400-023	355434	400662	Untreated	3	N/A
Adit	355400-024	355376	400639	Untreated	3	N/A
Adit	355400-005	355488	400715	Untreated	3	N/A

N/A = Data not available.

Data obtained from Coal Authority Consultants Coal Mining Report, dated 25th September 2019. Ref: 51002171859001.

LEGEND

- Site Boundary
 - Areas of Known Open Cast
 - Old Workings in Base of Open Cast and Potential Shallow Workings Beneath
 - Mine Shaft**
 - Adit
 - Untreated
 - Treated
 - Coal Seam Outcrops
 - Geological Fault (Tick Indicates Downthrown Geology)
 - Past Shallow Coal Mine Workings (Indicative CA Data)
 - Probable Shallow Coal Mine Workings (Indicative CA Data)
 - Area of open cast licence as shown by the CA plan ref: MR-LARGE-PLOT-51002171859001-1569404383516
- The area of open casting appears to be significantly smaller on the provided CA abandonment plans

Shallow and Deep Workings
 Wigan 5ft seam: base of coal = 18 m bgl.
 Wigan 4ft seam: base of coal = 38 m bgl.
 Wigan 6ft seam (due to fault downthrow): base of coal = circa. 50 m bgl.

Shallow and Deep Workings
 Wigan 6ft seam: base of coal = circa. 40 m bgl.
 Shallow workings exploiting the Wigan 4ft and 2ft area are also expected overlying the Wigan 6ft workings.

Nine Feet Downall Green Colliery
 Wigan 6ft seam worked. Potentially shallower than 40 m bgl due to no fault downthrow.

Shaft Depth = circa. 33 m bgl
 Potential base of Wigan 6ft seam.

Shallow and Deep Workings
 Shallow open cast workings relating to Wigan 2ft seam underlain by deeper workings of the Wigan 6ft at a depth of circa. 30 m bgl.

Areas of Infilled Ground
 Shallow open cast workings (approx. excavation base circa. 2 m - 11 m bgl).
 Open casts likely to have exploited the Wigan 6ft, Wigan 2ft and Wigan 4ft seams close to surface.
 The nature of fill is unknown.

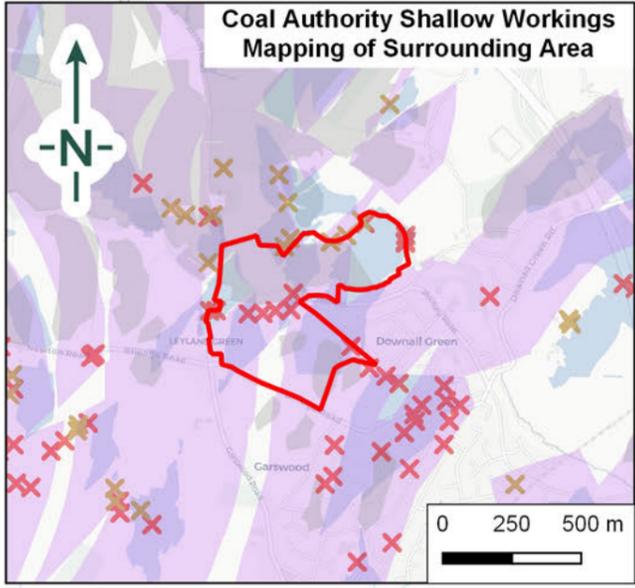
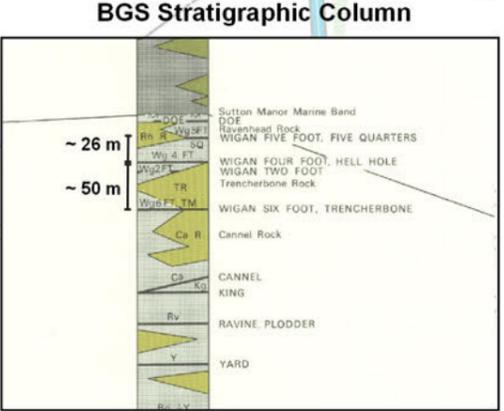
Potential Area of Reduced Developmental Risk
 No shallow workings anticipated to be underlying this area of the site. The King seam is considered to be in excess of circa. 40 m. The Wigan 6ft is outcropping to the east and is not expected to be underlying this area of the site.

Mine Shaft Easement
 The standoff distance from a residential property is approximately 20 m dependent on the thickness of the superficial deposits. Further discussions required with CA to inform master planning.

Shallow Workings Risk - Open Cast
 An area of open cast (now infilled) known to work the Wigan 5ft seam. The known base of the Wigan 5ft coal at its deepest extent is approx. 18 m bgl. The nature of fill within the open cast is unknown.

Shallow Workings Risk - Open Cast and Old Workings
 An area of open cast (now infilled) and old workings known to work the Wigan 4ft seam. The depth to the old workings / open cast exploiting the Wigan 4ft seam is understood to be approx. 10 m bgl. The nature of fill within the open cast is unknown.

Coal Seam	Rate of Dip	Dip Direction
Wigan 2ft	1:6	East/Southeast
Wigan 4ft	1:6	Southeast
Wigan 5ft	1:8.3	Northeast
Wigan 6ft	1:6	East/Southeast



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