

**Coal Mining Risk Assessment
at
Land Between 35 and 37
Pindar Oaks Cottages
Barnsley
For
Mr Peter Dimberline**

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1. Introduction

1.1 Design IT were appointed by Peter Dimberline, on behalf of his client, to undertake a Coal Mining Risk Assessment (CMRA) for a site comprising land between 35 and 37 Pindar Oaks Cottages, Barnsley, which is proposed for residential redevelopment. A planning application is to be submitted to Barnsley Metropolitan Borough Council (BMBC) and the site is identified as lying within a Coal Authority (CA) Coal Mining Development Referral Area, thus necessitating the requirement for a CMRA in order to provide BMBC with information on historic coal mining and an assessment of its potential impact on land stability.

1.2 The purpose of this CMRA is to:

- Present a desk-based review of all available information on the coal mining issues which are relevant to the application site
- Use that information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact of issues
- Set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development, and
- Demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of national planning policy with regard to development on unstable land

1.3 To this end the study has included an inspection of published historical maps, published geological data, publicly available planning information and a review of a CA mining report, together with other sources as indicated within the report.

1.4 This report presents the factual information available during this appraisal, interpretation of the data obtained and recommendations relevant to the scope of works outlined above.

1.5 The comments and opinions presented in this report are based on the findings of the available desk study assessment carried out by Design IT. Responsibility cannot be accepted for

any conditions not revealed by this desk study and which have not been taken into account by this assessment.

1.6 This report has been prepared for the sole use of Mr P Dimberline and his client. No other third party may rely upon or reproduce the contents of this report without written approval of Design IT. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk and we do not owe them any Duty of Care or Skill.

2. Site location and description

2.1 The site is centred on National Grid Reference 435733mE 405660mN, at Pindar Oaks Cottages, approximately 1.5km southeast of Barnsley town centre. A site location plan is included as **Appendix A**.

2.2 The site is rectangular and elongated measuring approximately 5 by 20m. It comprises the footprint of a former (now demolished) terraced property, no. 36 Pindar Oaks Cottages, together with the associated former rear yard area. The previous dwelling is understood to have been destroyed during a fire. An inspection of aerial imagery indicates it to be surfaced with formal hardstanding. A brick wall fronts the site onto Pindar Oaks Cottages. The site lies at approximately 83.0m AOD and locally levels fall towards the northwest. Existing residential properties bound the site in all directions.

Proposed development

2.3 It is proposed to construct a 2 storey infill residential terraced property within the footprint of the original property and an associated yard/garden. Presently, no details of the proposal are available.

Site history

2.4 Historical maps for the site and its surroundings, available from internet based sources, have been reviewed and a summary of this information, specifically relating to mining related features, is provided below.

Date	On site features	Off site features (coal mining related)
1852 – 1892	Open land.	Sandstone quarry c. 350m northwest. Sandstone quarries c. 450m northeast. Oaks colliery c. 850m northeast. Mount Osborne colliery c. 850m northwest.
1892 – 1906	Developed with a terraced residential property as part of	Pindar Oaks colliery c. 150m southwest.

	Pindar Oaks Cottages.	Clay pit c. 125m north.
1906 – 1961	No change.	Old shaft c. 125m southwest. Old shafts c. 500m southwest. Barnsley Main colliery c. 850m northeast.
1961 – 1978	Former terraced property occupying site is now demolished and site is vacant.	No change.
1978 – present	No change.	Barrow colliery (later disused) c. 1km northeast.

3. Geological setting and historical mining context

3.1 Information obtained from various sources pertaining to the site's geology and historical mining perspective is summarised in the table below with information sources identified as appropriate.

Information sources	British Geological Survey (BGS) 1:50 000 scale, sheet 87, Barnsley, bedrock and superficial and 1:10,000 scale, sheet SE30NE, bedrock and superficial. BGS online Borehole Database. Geological Survey memoir 'Geology of the Country around Barnsley', 1947. 'The Geology of the Yorkshire Coalfield', 1878 Green et. al. 'Sections of Strata of the Coal Measures of Yorkshire', Wilcockson W H, 1950 3rd Edition. CA online Interactive Viewer. CA mining report, Ref. 51001795448001, 16 February 2018 (included as Appendix B).
Made ground	None shown, although areas of made ground are indicated to the south and north.
Drift	None present.
Solid	Undifferentiated strata (mudstone, siltstone, sandstone and coal seams) of the Middle Coal Measures.
Dip of strata	Approximately 4 to 5° east.
Faults	A fault is shown just northeast of the site striking northwest to southeast and downthrowing to the northeast.
Coal seams	The Newhill coal seam is conjectured as outcropping just to the west of the site and is considered to underlie the site at shallow depth. The Meltonfield coal seam underlies the Newhill coal seam stratigraphically, however, it is not considered to underlie the site at shallow depth. Locally, BGS stratigraphic section thicknesses for these coal seams are; Newhill coal (0.61 to 1.37m) and Meltonfield coal (0.89 to 1.32m), the Newhill coal seam containing significant dirt partings. The separation of the Newhill coal and underlying Meltonfield coal seam is approximately 40 to 45m, as indicated locally.
Shafts, mine entries and collieries	The CA Interactive Viewer indicates numerous former mine entries (both adits and shafts) immediately north and south of the site. Geological mapping also indicates numerous adits and shafts within close proximity to the site, the adits associated with the nearby outcrop of the Newhill coal seam. Historic OS mapping indicates the Pindar Oaks colliery

	approximately 150m southwest, the Old Oaks (later Barnsley Main) colliery approximately 850m northeast and the Mount Osborne colliery approximately 850m northwest. The memoir cites that within historic crop workings in the vicinity of the site, the Newhill coal seam was recorded to be approximately 1.1m thick (total thickness including dirt partings). The shaft of Old Oaks colliery records the Newhill coal seam as 1.3m thick (including at least 2 dirt partings). The underlying Meltonfield coal seam is approximately 1.0m thick with some 46m of intervening measures (including the Woolley Edge Rock sandstone) between these coal seams.
Nearby intrusive information	No nearby intrusive records are available pertaining to the underlying Newhill coal seam.
Coal Authority mining report	A total of 7 seams of worked coal are recorded as present at between 200 and 510m beneath the site, last worked in 1978. However, at these depths any movement should have ceased by now. The site is in an area where there is coal at or close to the surface which may have been worked in the past. The site is unaffected by present or future mining. There are no known mine entries at, or within 20m, of the site. The site is unaffected by any past, present or future surface opencast mining. There are no records of any mine gas emissions requiring action within the site boundary. There are no coal mining subsidence claims recorded on, or within 50m, of the site.
Shallow mining	The CA Interactive Viewer indicates the site to lie within an area of probable past shallow coal mining and the site is defined as being located within a Development High Risk Area. Recorded past shallow mining associated with the Newhill coal seam is present immediately south of the site.
Surface mining	The historic OS mapping indicates a clay pit approximately 125m north and sandstone quarries approximately 350m northwest and 450m northeast. However, no former quarrying or clay pits are indicated as present on, or within close proximity, to the site itself.

4. Risk assessment

4.1 The potential risks to the redevelopment of the site associated with the coal mining legacy of the locality are summarised in the following table.

Coal mining issue	Risk		Risk assessment (Risk rating)
	Yes	No	
Underground coal mining (recorded at shallow depths)	-	No	CA records do not indicate historic recorded shallow mining beneath the site, however, these are recorded just to the south of the site. In addition, the former Pindar Oaks colliery was located immediately south of the site and former mine entries are recorded at the outcrop of the Newhill coal seam just west of the site, itself present at shallow depth beneath the site – Low
Underground coal mining (probable at shallow depths)	Yes	-	The site lies within a DHRA and the CA assesses the site as potentially underlain by past shallow mineworkings. The underlying Newhill coal seam is present beneath the site at shallow depth. Evidence of extensive historical mining (adits and shafts) in the vicinity and associated with the Newhill coal seam would suggest potential shallow mining of the coal seam beneath the site - High
Mine entries (shafts and adits)	Yes	-	No mine entries recorded on site, however unrecorded mine entries are a possibility. Numerous recorded former mine entries within the locality associated with both shallow (Newhill coal) and deeper coal seams - Low to Moderate
Coal mining geology (fissures)	-	No	CA information and published geology does not indicate any geological weaknesses on site, as a consequence of mining related activities – Low
Record of past mine gas emissions	Yes	-	CA information states no mine gas related issues in the locality. However, given the presence of potential shallow mining beneath the site generation of mine gases is considered possible - Low to Moderate
Recorded coal mining surface	-	No	CA information does not record the

hazard			presence of any mining surface hazards on or close to the site – Low
Surface mining (opencast workings including clay pits and sandstone quarries)	-	No	CA information state the site to be unaffected by any past, current or future open cast workings. Historical mapping does record a former clay pit within the vicinity of the site – Low

5. Discussion

5.1 The risk assessment above highlights several potential risks posed to the site during redevelopment, namely potential for shallow coal mineworkings, potential for unrecorded mine entries and associated mine gas emissions, cumulatively assessed as **low to high**. These risks are discussed in turn more fully below.

Shallow mineworkings

5.2 The Newhill coal seam is recorded as underlying the site at shallow depth and may potentially have been historically exploited by unrecorded mining. Given the conjectured location of outcrop of the Newhill coal seam close to the site's western boundary, and the recorded dip of the strata as 4 to 5° eastwards, it is estimated that the Newhill coal is likely to be present at shallow depth beneath the site. The depth of the Newhill coal seam is considered to be approximately 5 to 10m below the surface of the site with the underlying Meltonfield coal seam anticipated to be in excess of 50m depth. Nearby historic crop mining records indicate a thickness of 1.1m for the Newhill coal seam and 1.3m as recorded within the Old Oaks colliery to the northeast, both thicknesses including dirt partings. Assuming competent rock head is present within 1m of the surface and that a minimum of 10 times intact coal seam (including dirt partings) thickness of competent rock strata is required to be present above these seams to maintain surface stability in the event of them having been exploited, then there is considered to be *insufficient* competent rock cover above the Newhill coal seam and sufficient competent cover above the deeper Meltonfield coal seam. However, the surface stability at the site can only be comprehensively determined through undertaking intrusive works. Such intrusive investigations will determine whether mineworkings are present within the Newhill coal seam and to what extent, as well as confirming the depth of the coal seam together with its thickness beneath the site.

Mine entries

5.3 Due to the proximity of the outcrop of the Newhill coal seam and numerous recorded abandoned mine entries within the site's locality, the presence of on-site unrecorded former mine entries associated with the exploitation of this seam cannot be discounted. Prior to 1872, it was not a statutory requirement to record mine entries and mining plans. Furthermore, CA information

records the site as within an area of probable past shallow coal mining. Such features are considered as presenting a potential risk to development by way of instability and potential collapse.

However, given the site's previous development by a terraced property and its limited extent, it is considered unlikely that such features would be present on the site itself.

Mine gas

5.4 The potential for upward migration of mine gases beneath the site cannot be discounted. Such gases are particularly prevalent in former pillar and stall workings that remain open and allow them to build up over time. Mine gases pose a potential significant human health risk to the future occupants of dwellings and existing occupants of adjacent dwellings.

6. Proposed mitigation strategy

6.1 A review of geological and historical mining information at the site has shown that there is a **high** risk to surface stability from shallow mineworkings that may be present within the Newhill coal seam. Additionally, there is a potential **low to moderate** risk to surface stability by way of unrecorded former mine entries and a **low to moderate** risk exists for the site to be affected by potential mine gas emissions.

Shallow mineworkings

6.2 Geological, historical and CA mapping all demonstrate there to be a plausible risk presented by shallow mineworkings within the Newhill coal seam present beneath the site. It would be prudent, therefore, to undertake proof drilling across the site to confirm the depth to rockhead and depth to/nature of the underlying coal seam. Boreholes should be put down to 30m below existing ground levels with appropriate permission and licences obtained from the Coal Authority prior to commencing any such intrusive works. If shallow mining of the above coal seam is proved as presenting a risk to the surface stability of the site then drilling and grouting works may be required to consolidate the workings or the use of an appropriately designed foundation may be appropriate, subject to the findings of an intrusive investigation.

Mine entries

6.3 The presence of unrecorded mine entries should be confirmed. During site enabling works and a site strip the exposed sub soils should be checked for the presence of disturbed and potentially unstable ground associated with backfilling of such features. Vigilance should be taken during such works with respect to any anomalous findings. If mine entries are identified on the site, then these will require treatment by grouting and capping at the surface and the siting of any new development footprint over these features or within influencing distance should be avoided. In such circumstances consultation with the Coal Authority is recommended.

Mine gas

6.4 The incorporation of robust gas protection measures during construction are considered likely within the new development. However, such measures are inherently incorporated within the construction of new buildings by way of use of a well-constructed ground floor slab or use of a suspended floor slab offering a passively vented underfloor void, incorporation of a radon protection membrane (if appropriate) and a damp proof membrane together with the sealing of service entries. The requirement for a gas monitoring programme is not considered warranted, subject to the results of an intrusive investigation. It is recommended that advice and approval is sought from regulators at an early stage.

7. Conclusions

7.1 There is a potential risk posed to the redevelopment of the site from historic shallow mineworkings that may be present in the underlying Newhill coal seam. Such risks comprise surface instability from collapse of past shallow mineworkings. Proof drilling is recommended to better understand these risks.

7.2 In addition, as there can never be total certainty with regard to unrecorded mine entries, the developer should be made aware of this possibility during site stripping and excavation for foundations. Any evidence of the suspected presence of former mine entries should be investigated further.

7.3 Advice should be sought from regulators as to adoption of appropriate measures to protect against ground (mine) gases within the new development.

Appendix A
Site location plan

Pindar Oaks Cottages



Orthographic Survey of Pindar Oaks Cottages 2017. All rights reserved. Licence number 1002412. Project Ref: 111259

Promap

LANDSCAPE ARCHITECTS

Peter Dimberline RIBA

Appendix B
Coal Authority mining report



The Coal
Authority

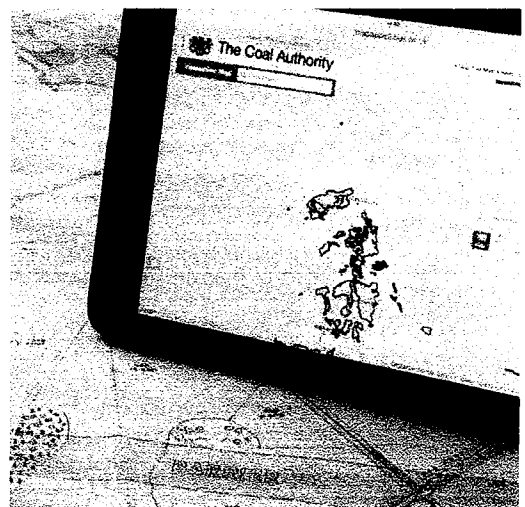
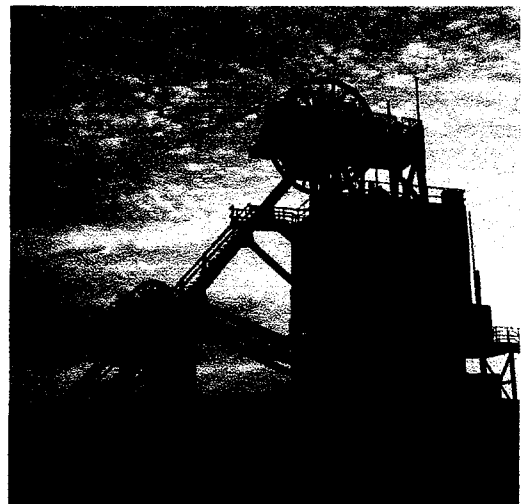
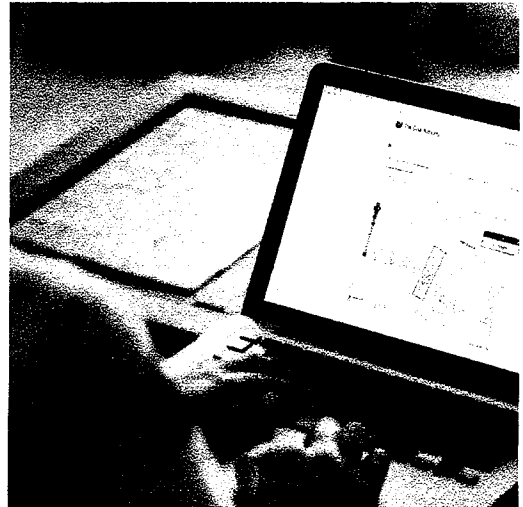
Resolving the **impacts** of mining

CON29M Residential Mining Report

35-37 PINDER OAKES COTTAGES
BARNESLEY
S70 3QN

Date of enquiry: 16 February 2018
Date enquiry received: 16 February 2018
Issue date: 16 February 2018

Our reference: 51001795448001
Your reference:



CON29M Residential Mining Report

This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

Ian Thopre

Enquiry address

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3QN

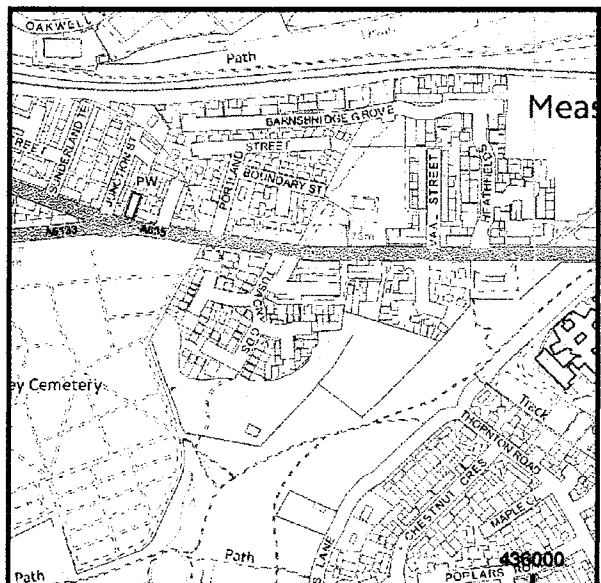
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Approximate position of property



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Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 7 seams of coal at 200m to 510m depth, and last worked in 1978.

Any movement in the ground due to coal mining activity should have stopped.

In addition the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on the Coal Authority information section of the report.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

5. Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Comments on the Coal Authority information

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In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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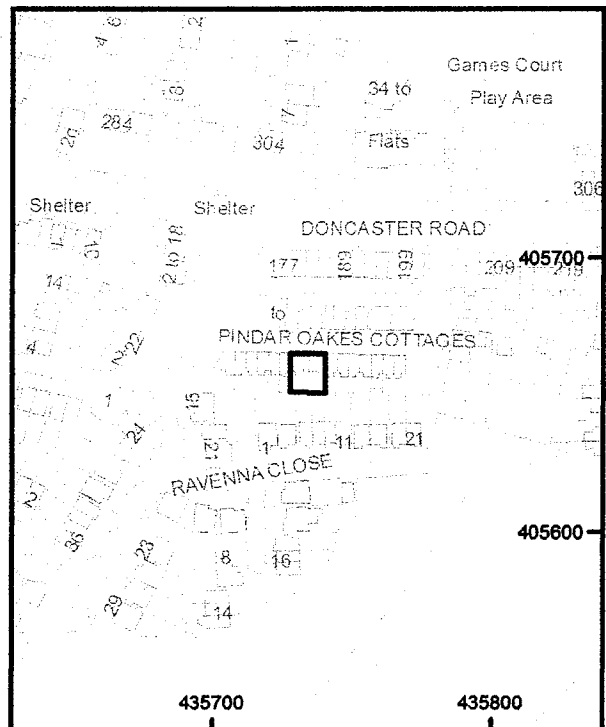
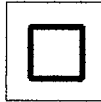
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Enquiry boundary

Key

Approximate position of enquiry boundary shown



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