Addendum to Appendix 10: Analysis of aggregate resources in ECA 10: Hagley Hinterland

July 2021

Introduction

1.1. In the hearing sessions undertaken as part of the examination of the emerging Worcestershire Minerals Local Plan, a change in screening criteria was proposed to no longer screen Source Protection Zone level 2 out of resource areas. In the previous version of the Analysis of Mineral Resources, areas overlapped by SPZ2 were marked as compromised.

1.2. To reflect this change, this addendum to *Appendix 10: Analysis of aggregate resources in ECA 10: Hagley Hinterland* has been produced to update the information held about resource areas, where these have changed by the change in criteria. However, only resource areas impacted by the change in criteria have been updated, this may mean these resources are visible in incorrect form on maps showing neighbouring resources which have not been changed.

1.3. The following resource areas in ECA 10: Hagley Hinterland have been impacted by this change:

- 10/24
- 10/25

Update to resource areas

Resource area 10/24

The following map shows the location of resource area 10/24. It is located near Five Ways. This is a large resource area intersected by roads, with some dispersed development.

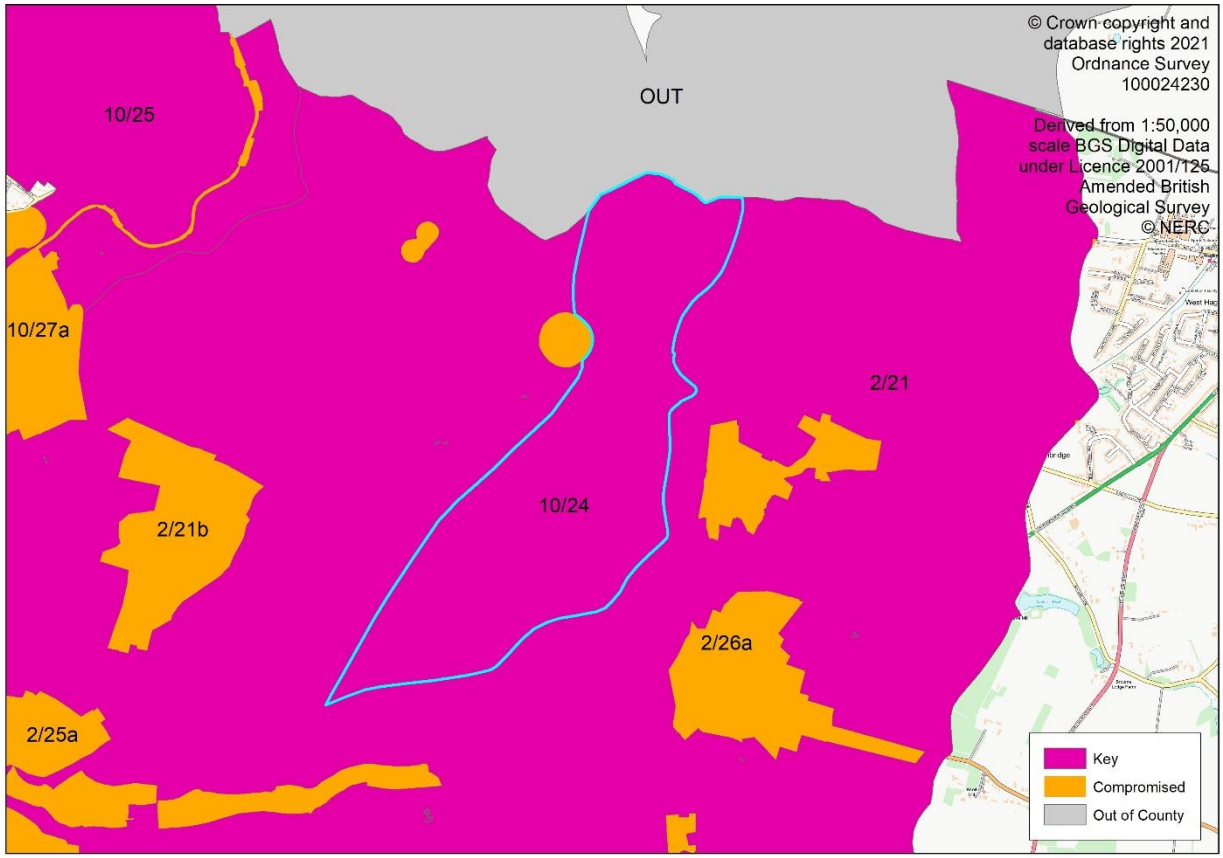

Figure 1. Resource area 10/24.

Resource description

The sand and gravel resources of this part of the county are Wildmoor sandstone formation and Kidderminster formation solid sand of considerable geological complexity. Resource area 10/24 is mapped as Kidderminster Formation.

The Kidderminster Formation is generally described as well-rounded pebble to cobble size conglomerate and red-brown, medium to coarse sandstone. The lower part of the formation predominantly consists of clast-supported conglomerate composed largely of pebbles and cobbles of red, red brown and grey fine-grained quartzite together with red sandstone, milky quartz and rare porphyritic igneous rocks and re-worked conglomerate. The formation rests uncomfortably on Bridgnorth Sandstone. The maximum thickness of the conglomerate dominated facies is probably about 20m but this is gradational into the overlying sandstone dominated facies, which also contains beds and lenses of pebble conglomerate.

The thickness of the Kidderminster formation in this district ranges from 112m – 133m, although the upper boundary is difficult to recognise because of the lithological similarity of the Kidderminster sandstone to the predominantly non-pebbly Wildmoor Sandstone. This resource area is an outcrop of the Kidderminster Formation bounded to the West by Stapenhill Fault which, near Iverley House Farm, truncates the Kidderminster Formation escarpment of Bunkers Hill, and then continues in a SSW direction to Hurcott Wood.

Estimated resource depth calculated as mid-point of 112m to 133m = 122.5m

Part of this resource is overlain by terrace or glacial sand and gravel (assessed as resource area 10/12).

Previous assessment

This resource area was last assessed as part of the Fourth Stage consultation on MLP (August 2018). At this stage, the resource area was split into areas 10/24 and 10/24b.

Area 10/24b contained parts of the resource screened out and marked as compromised due to the following appendix A criterion:

- Source Protection Zone 1 & 2

Area 10/24 contained the parts of the resource not impacted by the screening criteria. This resource area was 144ha in area, with an average depth of 122.5m. Therefore, the estimated resource volume was 88,200,000m^3, and the estimated tonnage (at 1.65 t/m^3) was **145,530,000 tonnes**.

Resource information	**Outcome for resource area 10/24**
Resource area	144ha
Resource depth	122.5m
Estimated resource volume	88,200,000m^3
Estimated tonnage	145,530,000 tonnes

Re-assessment of resource after MLP examination hearing sessions (2021) with SPZ 2 no longer screened out.

Now areas of Source Protection Zone 2 are no longer marked as compromised, resource area 10/24 is now 179ha in area, with an average depth of 122.5m. Therefore, the estimated resource volume is 109,637,500m^3, and the estimated tonnage (at 1.65 t/m^3) is **180,901,875 tonnes**.

Resource area 10/25

The following map shows the location of resource area 10/25. It is located to the north west of Kidderminster. This is a large resource area intersected by roads.

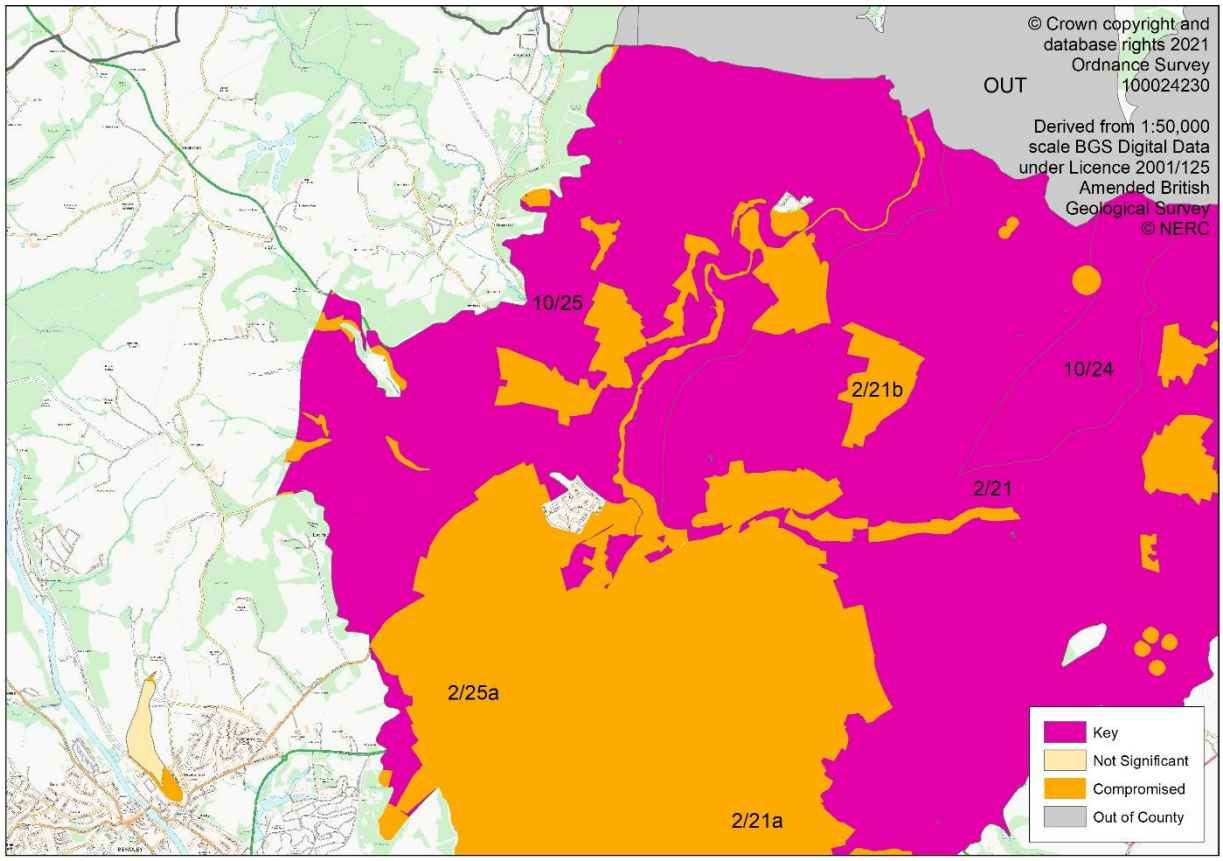

Figure 2. Resource area 10/25.

Resource description

The sand and gravel resources of this part of the county are Wildmoor sandstone formation and Kidderminster formation solid sand of considerable geological complexity. Resource area 10/25 is mapped as Kidderminster Formation.

The Kidderminster and Wildmoor sandstones are partially but extensively overlain by terrace and glacial sand and gravel deposits, which are recorded as separate resource areas (10/1, 10/2, 10/3, 10/4, 10/5 and 10/6).

The Kidderminster Formation is generally described as well-rounded pebble to cobble size conglomerate and red-brown, medium to coarse sandstone. The lower part of the formation predominantly consists of clast-supported conglomerate composed largely of pebbles and cobbles of red, red brown and grey fine-grained quartzite together with red sandstone, milky quartz and rare porphyritic igneous rocks and re-worked conglomerate. The formation rests uncomfortably on Bridge north Sandstone. The maximum thickness of the conglomerate dominated facies is probably about 20m but this is gradational into the overlying sandstone dominated facies, which also contains beds and lenses of pebble conglomerate. The memoir states that the thickness of the formation ranges from 112m – 133m, although the

upper boundary is difficult to recognise because of the lithological similarity of the Kidderminster sandstone to the predominantly non-pebbly Wildmoor Sandstone.

There is some more detailed information about some sections of the deposit:

- Near Low Habberley and Franche: Along the east side of Habberley Valley a pronounced escarpment is formed by the Kidderminster Formation capping Wildmoor Sandstone and many exposures of the latter are visible in the lower part of the scarp. Crags of brown, current bedded sandstone are abundant on the floor of the valley, conspicuously at the Peckett Rock, 250m north-north-west of the Habberley Valley Inn, where over 50' (15.2m) of sandstone is exposed.

  Numerous exposures are reported to occur in the valleys to the north west of Franche in the escarpment which bounds the Habberley Valley. In a road section south east of High Habberley over 140' (42.7m) of sandstone beds with some pebbles are exposed. A northerly trending fault throws these beds against 5' (1.5m) of reddish brown sandstone without pebbles (Wildmoor Sandstone).

  North west of this road cutting, in the grounds of High Habberley House, exposures near the base of the Kidderminster Formation show a conspicuous band of very coarse breccia containing large angular fragments up to 6" in diameter. A typical section in this location consists of: 6' of pebbly red sandstone overlying 8" of red sandstone with fewer pebbles, 4' of pebbly red sandstone, and 5' 6" of coarse breccia (total depth of 16'2", 4.9m).

  The Kidderminster Formation, present as a calcareous grit, caps the Wildmoor Sandstone cliff at Ridgestone Rock and Jacob's Ladder at the northern end of Habberley Valley. Elsewhere, calcareous grit and conglomerate near the base of the Kidderminster Formation were formally exposed adjacent to the Kidderminster to Bridgenorth road about 650 yards north east of Lower Barns Farm, at the junction of Lower Lane and Honeybrook lane however, sandstone of Kidderminster type, with few or no pebbles is exposed.
- Blakeshall, Wolverley and Cookley: There are reported to be many exposures near Blakeshall, Wolverley and Cookley although few details are given. Red sandstone with calcareous grit and breccia, a little above the middle of the Pebble beds, appears in the sides of the valley about 900 yards North West of Cookley Church, while a lane near Wolverley Church shows up to 50' (15.2m) of pebbly sandstones. In general, in this area, pebbly sandstones and coarse pebbly grits, in part calcareous, range nearly to the top of the formation, but conglomerates are rare.
- Kinver Edge and Drakelow: At Kinver Edge the memoir records the basement bed is only approximately 2' (0.6m) thick consisting of a marly or sandy breccia with, in places, coarse pebbly grit above. Shingle beds higher in the sequence make a feature parallel to and south east of the Edge, but this dies out near the Lodge, on the county boundary. A calcareous grit on breccia forms the basement bed along the remainder of the escarpment. Near Drakelow it appears to be about 2' (0.6m) thick but lenses of similar calcareous breccia occur in places above the actual base.
- There is a distinctive 5 1/2ft (1.7m) band of coarse angular breccia near the base of the Formation at High Habberley.

- A borehole at Sleepy Pool Mill (on the boundary between this resource area and 2/21 at grid reference 385480 280630, near Caunsall) recorded 8m of sandy clay (alluvium) overlying 2m of red, soft sandstone (Wildmoor) and 40m of red sandstone (tentatively assigned to the Kidderminster formation) (total 42m).

Estimated resource depth calculate as a mean average of: a) memoir range of the Kidderminster formation (median average of 112m to 133m): 122.5m, b) exposure near Habberley Valley Inn: 15.2m, c) road section south east of High Habberley: 42.7m, d) typical section at High Habberley House: 4.9m, e) exposure in a lane near Wolverley Church: 15.2m, f) memoir record for Kinver Edge: 0.6m, g) borehole at Sleepy Pool Mill: 42m = 34.7m

Previous assessment

This resource area was last assessed as part of the Fourth Stage consultation on MLP (August 2018). At this stage, the resource area was split into areas 10/25 and 10/25b.

Area 10/25b contained parts of the resource screened out and marked as compromised due to the following appendix A criterion:

- Ancient Semi-Natural Woodland
- Conservation Area
- Listed Building
- Scheduled Ancient Monument
- Settlement Boundary
- Site of Special Scientific Interest
- Source Protection Zone

Area 10/25 contained the parts of the resource not impacted by the screening criteria. This resource area was 1100ha in area, with an average depth of 34.7m. Therefore, the estimated resource volume was 190,850,000m^3, and the estimated tonnage (at 1.65 t/m^3) was **314,902,500 tonnes**.

Re-assessment of resource after MLP examination hearing sessions (2021) with SPZ 2 no longer screened out.

Now areas of Source Protection Zone 2 are no longer marked as compromised, resource area 10/25 is now 1161ha in area, with an average depth of 34.7m. Therefore, the estimated resource volume is 201,433,500m^3, and the estimated tonnage (at 1.65 t/m^3) is **332,365,275 tonnes**.