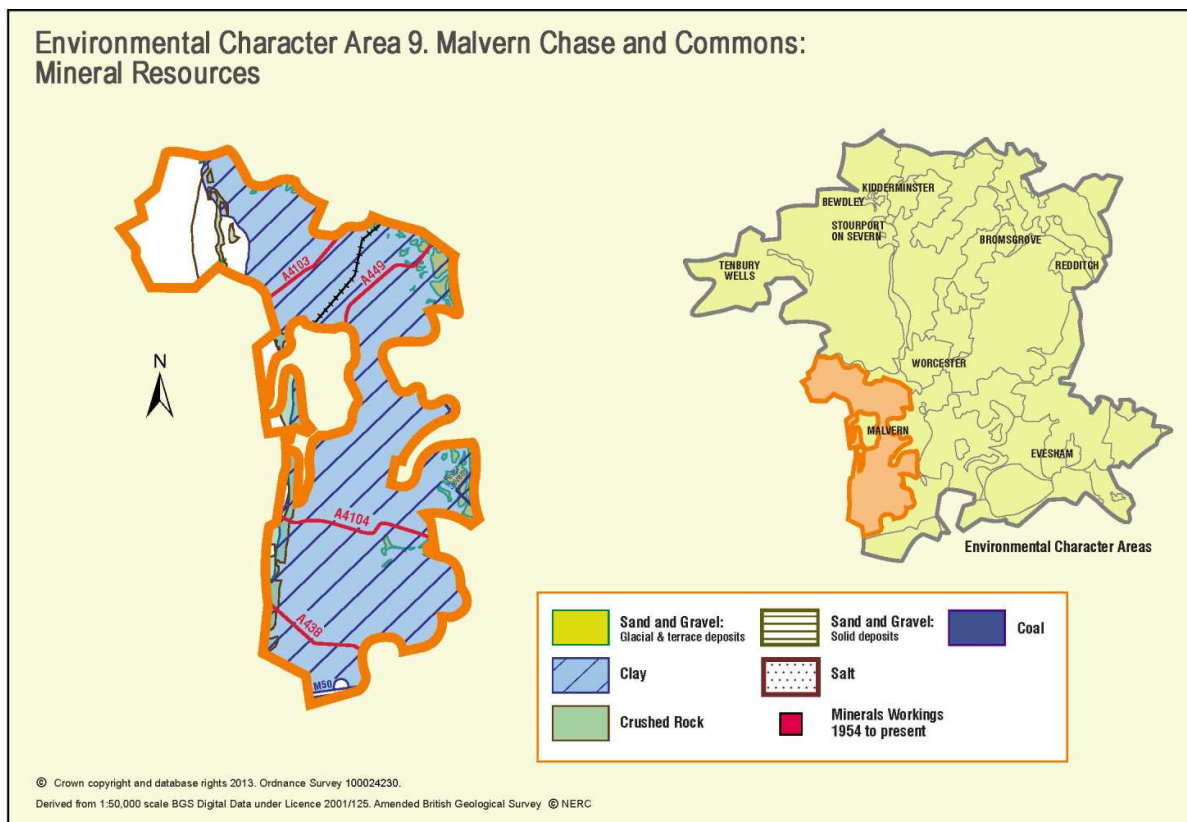


Appendix 9: Analysis of aggregate resources in ECA 9: Malvern Chase and Commons



ECA Summary for the Fourth Stage consultation on MLP (Winter 2018):

Sand and gravel

There are 15 resource areas identified for sand and gravel in Malvern Chase and Commons ECA:

- Key: 1
- Significant: 4
- Not significant: 3
- Compromised: 7

Crushed rock

There are 6 resource areas identified in Malvern Chase and Commons ECA for crushed rock:

- Significant: 1
- Compromised: 5

Non-aggregates

BGS data indicates that there are deposits of clay in this ECA.

Overview of resource assessment for ECA 9

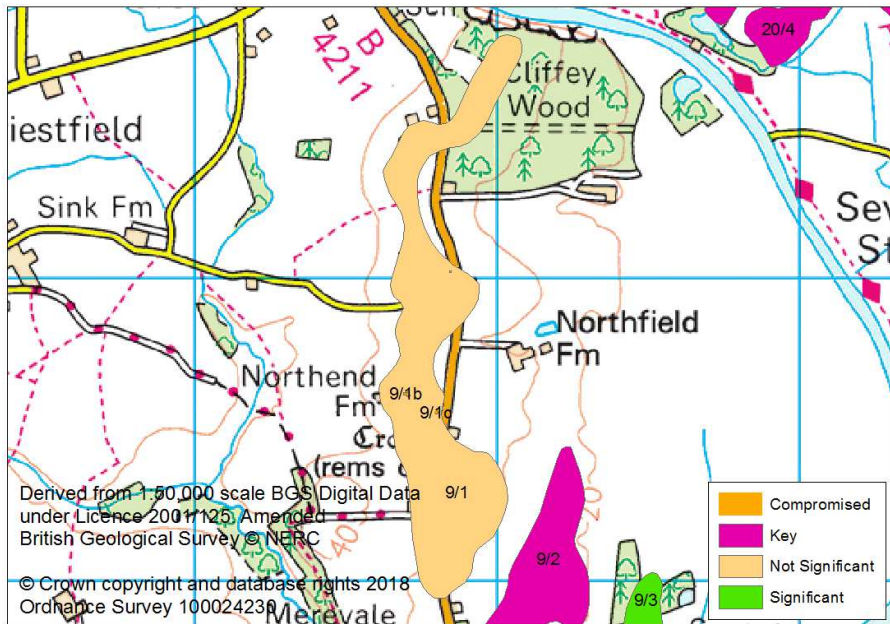
Sand and gravel resource areas:

Resource number*	Second Stage Consultation		Third Stage Consultation		Fourth Stage Consultation		
	Original estimated resource tonnage (2 tonnes/m³)	Significance	Revised estimate of resource tonnage (1.65 tonnes/m³)	Significance	New resource number (where resource has been split)	Revised estimate of resource tonnage (1.65 tonnes/m³)	Result
9/1	510,000	Not significant	420,750	Not significant	Not reassessed		
9/2	3,570,000	Key	2,945,250	Key	9/2	2,743,125	Key
					9/2b		Compromised
9/3	1,800,000	Significant	1,485,000	Significant	9/3	1,485,000	Significant
					9/3b		Compromised
9/4	290,000	Not significant	239,250	Not significant	Not reassessed		
9/5	385,000	Compromised	317,625	Compromised			
9/6	1,435,000	Significant	1,183,875	Significant	9/6	1,115,000	Significant
					9/6b		Compromised
9/7	2,484,000	Key	2,049,300	Key	9/7	1,745,700	Significant
					9/7b		Compromised
9/7a	690,000	Compromised	569,250	Compromised	Not reassessed		
9/8	780,000	Significant	643,500	Significant	9/8	643,500	Significant
					9/8b		Compromised
9/9	Depth not known	Not significant	Depth not known	Not significant	Not reassessed		

Crushed rock resource areas:

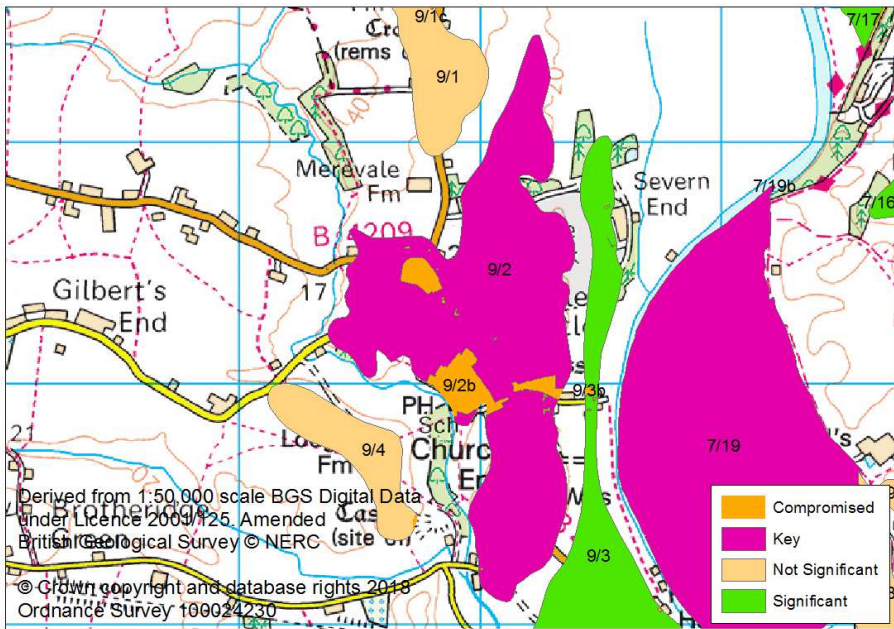
Resource number*	Second Stage Consultation		Third Stage Consultation		Fourth Stage Consultation		
	Original estimated resource tonnage (2.7 tonnes/m ³)	Significance	Revised estimate of resource tonnage (2.45 tonnes/m ³)	Significance	New resource number (where resource has been split)	Revised estimate of resource tonnage (2.45 tonnes/m ³)	Result
9/10	937,575,000	Key	850,762,500	Key			Compromised
9/11	129,600,000	Key	117,600,000	Key			Compromised
9/12	30,375,000	Key	27,562,500	Key			Compromised
9/13	2,025,000	Key	1,837,500	Key			Compromised
9/14	3,442,500	Key	3,123,750	Key	9/14	1,470,000	Significant
					9/14b		Compromised

Overview	
Resource number:	9/1
Resource name:	Northend Farm
Resource area:	34 ha
Resource depth:	Estimated 1.5m
Location	
OS sheet reference:	SO 84 SW
National grid ref:	383811, 243751



Resource description:	
Resource description:	4 th terrace (Kidderminster Station) sand and gravel. No boreholes or exposures are recorded but the 4 th terrace deposits are tentatively correlated with those in the Teme Valley at Lower Poswick Farm where up to 1.5m of gravel are present. (Estimated resource depth based on exposure at Lower Poswick Farm of 1.5m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small deposit with small-scale dispersed development across the resource area.
Crude estimate of resource:	Area: 34ha x average depth: 1.5m / 2 Estimated resource volume: 255,000m ³ . Estimated resource tonnage (at 2 t/m³): 510,000 tonnes
Conclusion:	Not significant: Small deposit with less than 300,000m ³ . Not for consideration in defining areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 34ha x average depth: 1.5m / 2 Estimated resource volume: 255,000m ³ . Estimated resource tonnage (at 1.65 t/m³): 420,750 tonnes
Conclusion:	Not significant.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
Not reassessed due to resource not being classified as Key or Significant in the Third Stage Consultation	

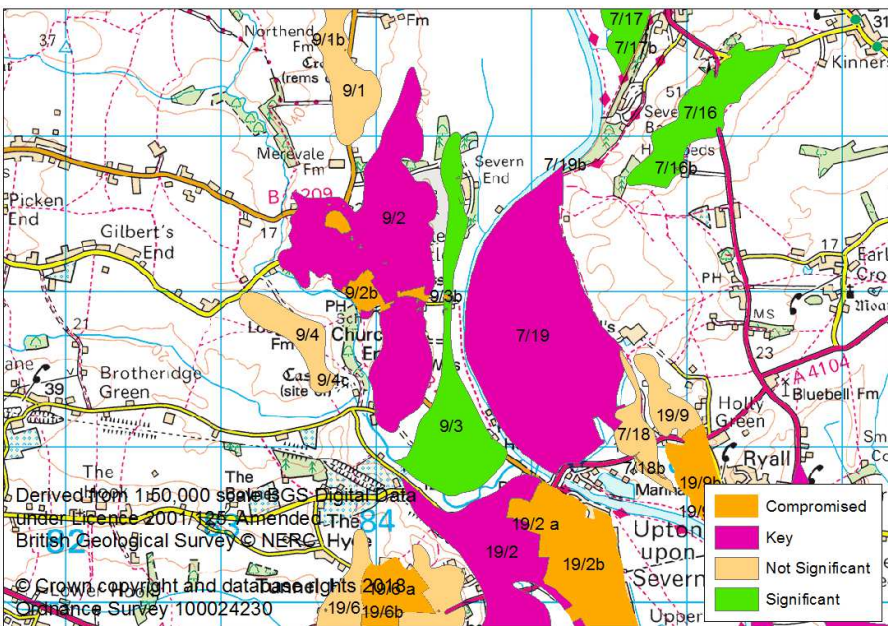
Overview	
Resource number:	9/2
Resource name:	Hanley Castle
Resource area:	102 ha
Resource depth:	Estimated 3.5m
Location	
OS sheet reference:	SO 84 SW
National grid ref:	384024, 242220



Resource description:	
Resource description:	3 rd terrace (Holt Heath) sand and gravel. No boreholes or exposures are recorded but the 3 rd terrace generally comprises gravel, sandy gravel and sand which may be clayey or cobbly and between 1m and 6m thick. (Estimated resource depth based on median depth of 3.5m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A medium-sized deposit partially compromised by the village of Hanley Castle and with small-scale dispersed development across the resource area.
Crude estimate of resource:	Area: 102ha x average depth: 3.5m / 2 Estimated resource volume: 1,785,000m ³ . Estimated resource tonnage (at 2 t/m³): 3,570,000 tonnes
Conclusion:	Significant – key resource. Use to define areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 102ha x average depth: 3.5m / 2 Estimated resource volume: 1,785,000m ³ . Estimated resource tonnage (at 1.65 t/m³): 2,945,250 tonnes
Conclusion:	Significant – key resource.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
This resource area has been split into areas 9/2 and 9/2b.	
Resource area 9/2	Resource area 9/2b

Resource area:	95 ha	Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none"> - Conservation Area - Listed Buildings - Settlement boundary - Scheduled Ancient Monument
Resource depth:	Estimated 3.5m		
Revised estimate of resource:	Area: 95 ha x average depth: 3.5m ÷ 2 Estimated resource volume: 1,662,500 m ³ Estimated resource tonnage (at 1.65 t/m³): 2,743,125 tonnes		
Conclusion:	Key resource	Conclusion:	Compromised

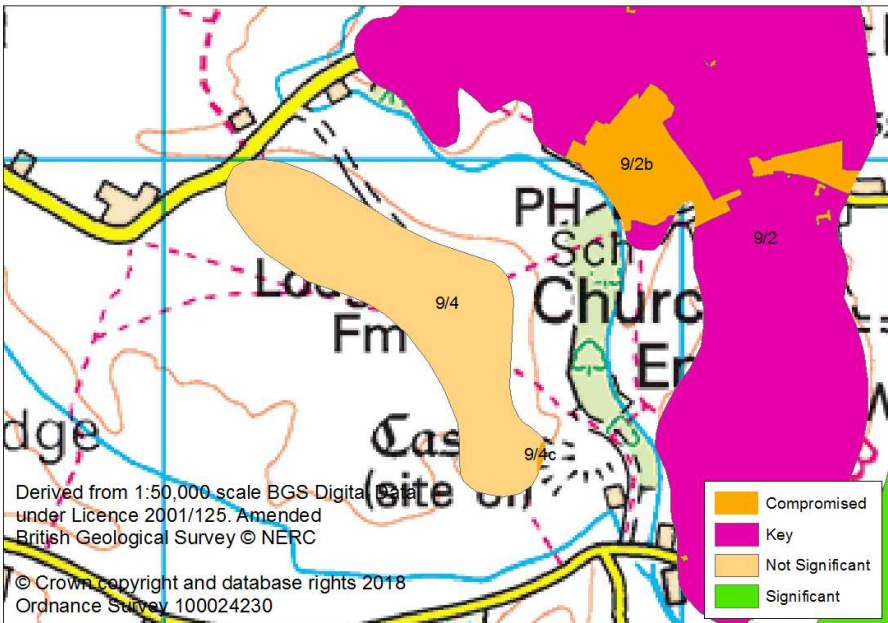
Overview	
Resource number:	9/3
Resource name:	East of Hanley Castle
Resource area:	45ha
Resource depth:	4m
Location	
OS sheet reference:	SO 84 SW
National grid ref:	384494, 241434



Resource description:	
Resource description:	2 nd terrace (Worcester) sand and gravel. The pebble content is indistinguishable from that of the 3 rd terrace. It is usually described as sand and gravel although some boreholes in the 2 nd terrace proved only silt and clay. The deposit generally varies between 2m and 6m in thickness. (Estimated resource depth based on median depth of 4m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small deposit with small-scale dispersed development across the resource area.
Crude estimate of resource:	Area: 45ha x average depth: 4m / 2 Estimated resource volume: 900,000m ³ . Estimated resource tonnage (at 2 t/m³): 1,800,000 tonnes
Conclusion:	Significant. Consider in defining areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 45ha x average depth: 4m / 2 Estimated resource volume: 900,000m ³ . Estimated resource tonnage (at 1.65 t/m³): 1,485,000 tonnes
Conclusion:	Significant.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
This resource area has been split into areas 9/3 and 9/3b.	
Resource area 9/3	Resource area 9/3b

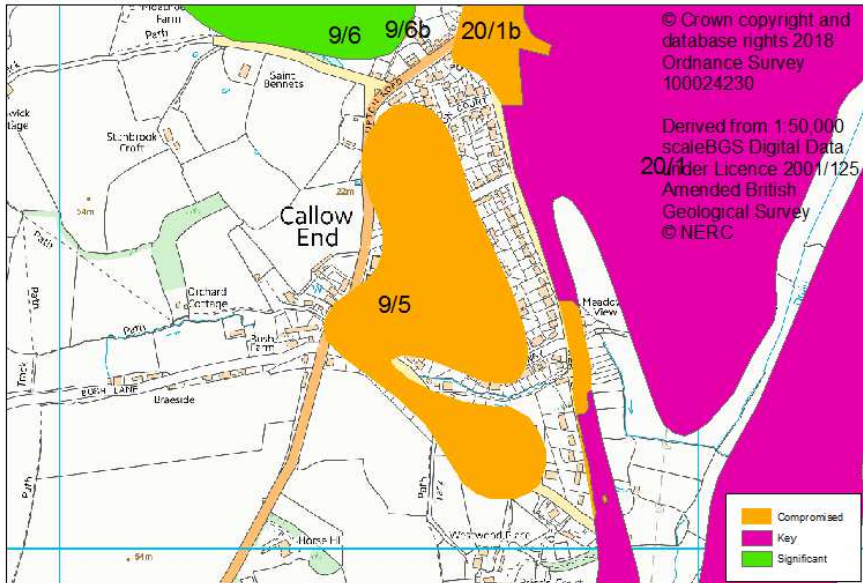
Resource area:	45 ha	Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none"> - Listed Buildings - Settlement boundary
Resource depth:	Estimated 4m		
Revised estimate of resource:	Area: 45ha x average depth: 4m / 2 Estimated resource volume: 900,000m ³ . Estimated resource tonnage (at 1.65 t/m³): 1,485,000 tonnes		
Conclusion:	Significant resource	Conclusion:	Compromised

Overview	
Resource number:	9/4
Resource name:	Lodge Farm
Resource area:	14ha
Resource depth:	Estimated 3.5m
Location	
OS sheet reference:	SO 84 SW
National grid ref:	383465, 241722



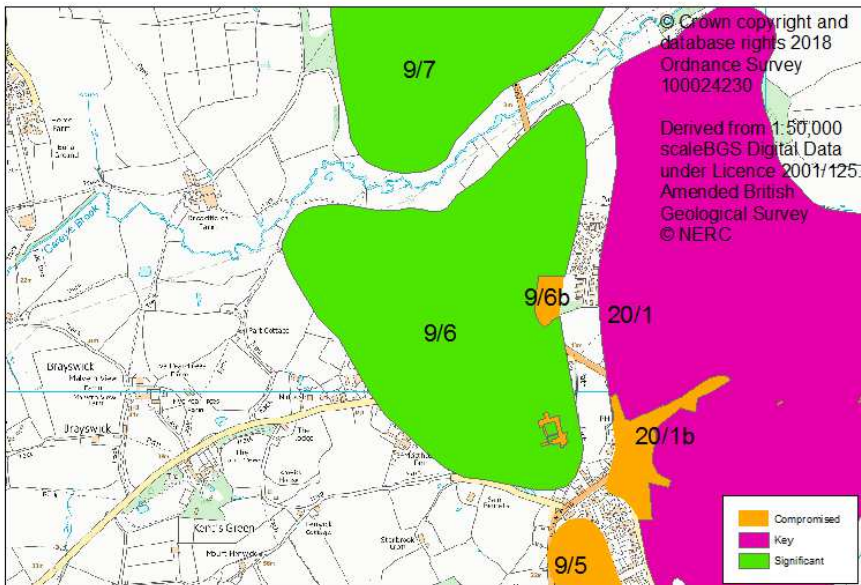
Resource description:	
Resource description:	3 rd terrace (Holt Heath) sand and gravel. No boreholes or exposures are recorded but the memoir for this area states that the 3 rd terrace generally comprises gravel, sandy gravel and sand which may be clayey or cobbly and between 1m and 6m thick. (Estimated resource depth based on median depth of 3.5m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small deposit with small-scale development on the north-western periphery of the resource area.
Crude estimate of resource:	Area: 14ha x average depth: 3.5m / 2 Estimated resource volume: 245,000m ³ Estimated resource tonnage (at 2 t/m³): 290,000 tonnes.
Conclusion:	Not significant: Small deposit with less than 300,000m ³ . Not for consideration in defining areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 14ha x average depth: 3.5m / 2 Estimated resource volume: 245,000m ³ Estimated resource tonnage (at 1.65 t/m³): 239,250 tonnes
Conclusion:	Not significant.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
Not reassessed due to resource not being classified as Key or Significant in the Third Stage Consultation	

Overview	
Resource number:	9/5
Resource name:	Callow End
Resource area:	11 ha
Resource depth:	Estimated 3.5m
Location	
OS sheet reference:	SO 84 NW
National grid ref:	383594, 249383



Resource description:	
Resource description:	3 rd terrace (Holt Heath) sand and gravel. No boreholes or exposures are recorded but the memoir for this area states that the 3 rd terrace generally comprises gravel, sandy gravel and sand which may be clayey or cobbly and between 1m and 6m thick. (Estimated resource depth based on median depth of 3.5m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small deposit, almost entirely compromised by Callow End village.
Crude estimate of resource:	Area: 11ha x average depth: 3.5m x 0.5 Estimated resource volume: 192,500m ³ Estimated resource tonnage (at 2 t/m³): 385,000 tonnes
Conclusion:	Compromised by development.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 11ha x average depth: 3.5m x 0.5 Estimated resource volume: 192,500m ³ Estimated resource tonnage (at 1.65 t/m³): 317,625 tonnes
Conclusion:	Compromised by development.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
Not reassessed due to resource not being classified as Key or Significant in the Third Stage Consultation	

Overview	
Resource number:	9/6
Resource name:	North of Callow End
Resource area:	41ha
Resource depth:	3.5m
Location	
OS sheet reference:	SO 85 SW
National grid ref:	383270, 250200



Resource description:	
Resource description:	3 rd terrace (Holt Heath) sand and gravel. No boreholes or exposures are recorded but the memoir for this area states that the 3 rd terrace generally comprises gravel, sandy gravel and sand which may be clayey or cobbly and between 1m and 6m thick. (Estimated resource depth based on median depth of 3.5m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small resource area with small-scale dispersed development across the resource area.
Crude estimate of resource:	Area: 41ha x average depth: 3.5m x 0.5 Estimated resource volume: 717,500m ³ Estimated resource tonnage (at 2 t/m³): 1,435,000 tonnes
Conclusion:	Significant. Consider in defining areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 41ha x average depth: 3.5m x 0.5 Estimated resource volume: 717,500m ³ . Estimated resource tonnage (at 1.65 t/m³): 1,183,875 tonnes
Conclusion:	Significant.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
This resource area has been split into areas 9/6 and 9/6b.	
Resource area 9/6	
Resource area:	40 ha
Resource area 9/6b	
Commentary:	Screened out due to the following appendix A criterion:

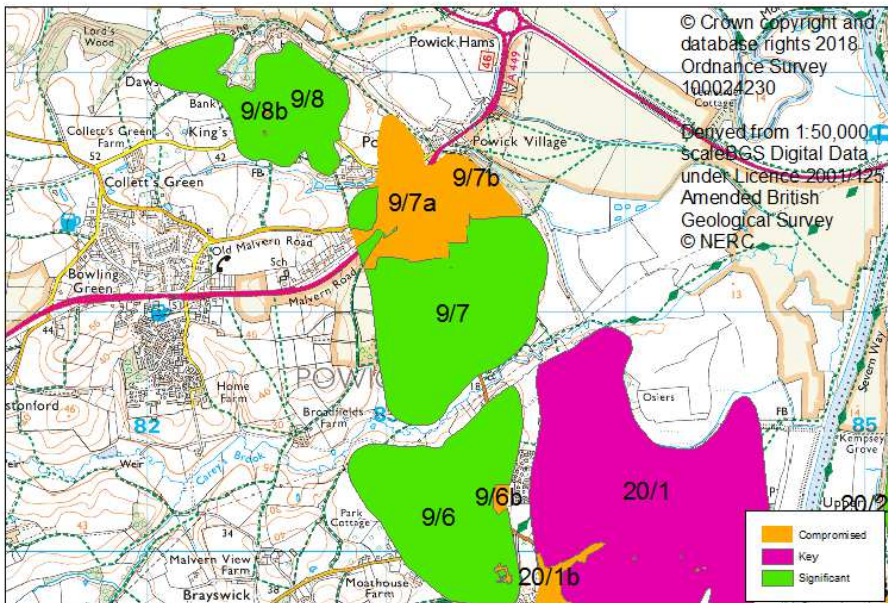
Resource depth:	Estimated 3.5m		<ul style="list-style-type: none"> - Allocated site in South Worcestershire Development Plan - Listed Buildings - Settlement boundary
Revised estimate of resource:	Area: 40ha x average depth: 3.5m / 2 Estimated resource volume: 700,000m ³ Estimated resource tonnage (at 1.65 t/m³): 1,155,000 tonnes		
Conclusion:	Significant resource	Conclusion:	Compromised

Overview	
Resource number:	9/7
Resource name:	Powick
Resource area:	54 ha
Resource depth:	Estimated 4.6m
Location	
OS sheet reference:	SO 85 SW
National grid ref:	383235, 251168

Resource description:	
Resource description:	3 rd terrace (Holt Heath) sand and gravel. The memoir for this area states that the 3 rd terrace generally comprises gravel, sandy gravel and sand which may be clayey or cobbly. A borehole in Powick records 4.6m of sand and gravel. (Estimated resource depth based on borehole depth of 4.6m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A medium-sized resource area intersected by a road with small-scale ribbon development and other small scale development on the periphery of the resource area. The deposit extends under Powick village, this is considered as resource area 9/7a.
Crude estimate of resource:	Area: 54ha x average depth: 4.6m / 2 Estimated resource volume: 1,242,000m ³ . Estimated resource tonnage (at 2 t/m³): 2,484,000 tonnes
Conclusion:	Significant – key resource. Use to define areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 54ha x average depth: 4.6m / 2 Estimated resource volume: 1,242,000m ³ . Estimated resource tonnage (at 1.65 t/m³): 2,049,300 tonnes
Conclusion:	Significant – key resource.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	

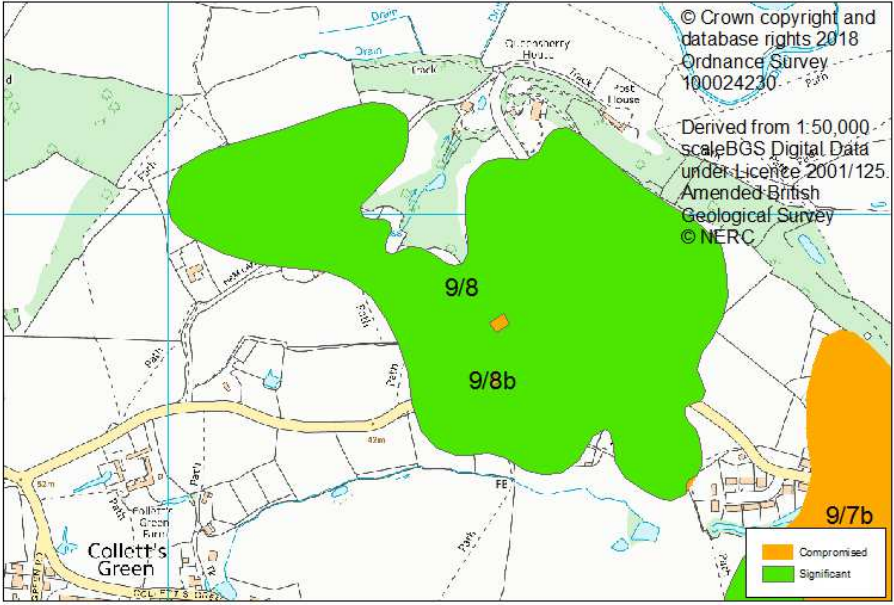
This resource area has been split into areas 9/7 and 9/7b.			
Resource area 9/7		Resource area 9/7b	
Resource area:	46 ha	Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none"> - Allocated site in South Worcestershire Development Plan - Conservation Area - Listed Buildings - Settlement boundary
Resource depth:	Estimated 4.6m		
Revised estimate of resource:	Area: 46ha x average depth: 4.6m / 2 Estimated resource volume: 1,058,000m ³ Estimated resource tonnage (at 1.65 t/m³): 1,745,700 tonnes		
Conclusion:	Significant resource	Conclusion:	Compromised

Overview	
Resource number:	9/7a
Resource name:	Powick a)
Resource area:	15 ha
Resource depth:	Estimated 4.6m
Location	
OS sheet reference:	SO 85 SW
National grid ref:	383235, 251168



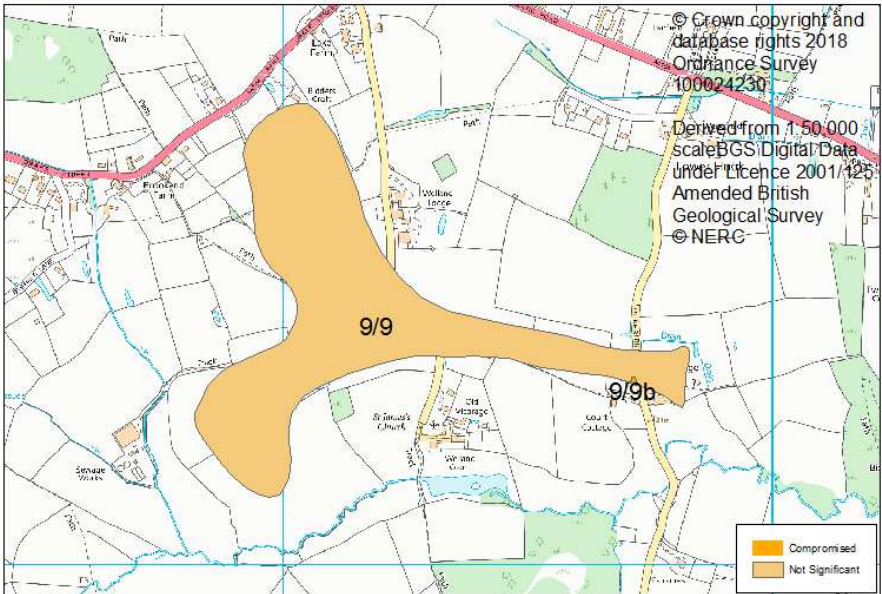
Resource description:	
Resource description:	3 rd terrace (Holt Heath) sand and gravel. The memoir for this area states that the 3 rd terrace generally comprises gravel, sandy gravel and sand which may be clayey or cobbly. A borehole in Powick records 4.6m of sand and gravel. (Estimated resource depth based on borehole depth of 4.6m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small resource area compromised by Powick village, with less than 10ha remaining.
Crude estimate of resource:	Area: 15ha x average depth: 4.6m / 2 Estimated resource volume: 345,000m ³ .

	Estimated resource tonnage (at 2 t/m³): 690,000 tonnes
Conclusion:	Compromised by development with less than 10ha of the deposit remaining.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 15ha x average depth: 4.6m / 2 Estimated resource volume: 345,000m ³ Estimated resource tonnage (at 1.65 t/m³): 569,250 tonnes
Conclusion:	Compromised by development.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
Not reassessed due to resource not being classified as Key or Significant in the Third Stage Consultation	

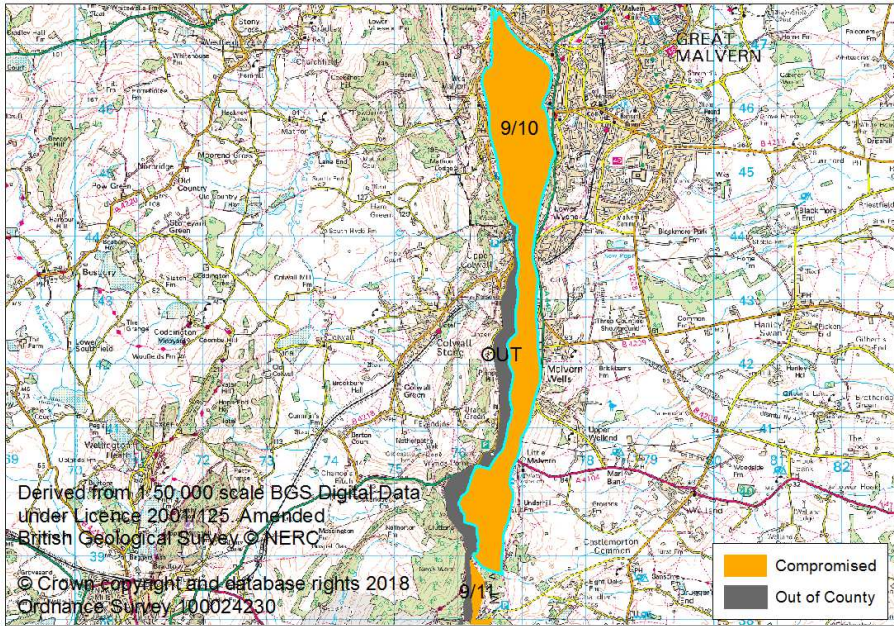
Overview	
Resource number:	9/8
Resource name:	King's End
Resource area:	26ha
Resource depth:	Estimated 3m
Location	
OS sheet reference:	SO 85 SW
National grid ref:	382491, 251890
	
Resource description:	
Resource description:	4 th terrace (Kidderminster Station) sand and gravel. The deposit varies in grade from gravel to sand and according to the BGS memoirs its thickness is believed to range from 1-5m, and may be up to 3m thick at this point. (Estimated resource depth based on median depth of 3m)
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small deposit with small-scale dispersed development across the resource area.
Crude estimate of resource:	Area: 26ha x average depth: 3m / 2 Estimated resource volume: 390,000m ³

Estimated resource tonnage (at 2 t/m³): 780,000 tonnes																	
Conclusion:	Significant. Consider in defining areas of search.																
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)																	
Revised estimate of resource:	Area: 26ha x average depth: 3m / 2 Estimated resource volume: 390,000m³ Estimated resource tonnage (at 1.65 t/m³): 643,500 tonnes																
Conclusion:	Significant.																
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)																	
This resource area has been split into areas 9/8 and 9/8b.																	
<table><tr><th colspan="2">Resource area 9/8</th><th colspan="2">Resource area 9/8b</th></tr><tr><td>Resource area:</td><td>26 ha</td><td rowspan="3">Commentary:</td><td rowspan="3">Screened out due to the following appendix A criterion: <ul style="list-style-type: none">- Listed Buildings- Settlement Boundary</td></tr><tr><td>Resource depth:</td><td>Estimated 3m</td></tr><tr><td>Revised estimate of resource:</td><td>Area: 26ha x average depth: 3m / 2 Estimated resource volume: 390,000m³ Estimated resource tonnage (at 1.65 t/m³): 643,500 tonnes</td></tr><tr><td>Conclusion:</td><td>Significant resource</td><td>Conclusion:</td><td>Compromised</td></tr></table>		Resource area 9/8		Resource area 9/8b		Resource area:	26 ha	Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none">- Listed Buildings- Settlement Boundary	Resource depth:	Estimated 3m	Revised estimate of resource:	Area: 26ha x average depth: 3m / 2 Estimated resource volume: 390,000m³ Estimated resource tonnage (at 1.65 t/m³): 643,500 tonnes	Conclusion:	Significant resource	Conclusion:	Compromised
Resource area 9/8		Resource area 9/8b															
Resource area:	26 ha	Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none">- Listed Buildings- Settlement Boundary														
Resource depth:	Estimated 3m																
Revised estimate of resource:	Area: 26ha x average depth: 3m / 2 Estimated resource volume: 390,000m³ Estimated resource tonnage (at 1.65 t/m³): 643,500 tonnes																
Conclusion:	Significant resource	Conclusion:	Compromised														

Overview	
Resource number:	9/9
Resource name:	Welland Lodge
Resource area:	21ha
Resource depth:	Not known.
Location	
OS sheet reference:	SO 73 NE
National grid ref:	381148, 239525



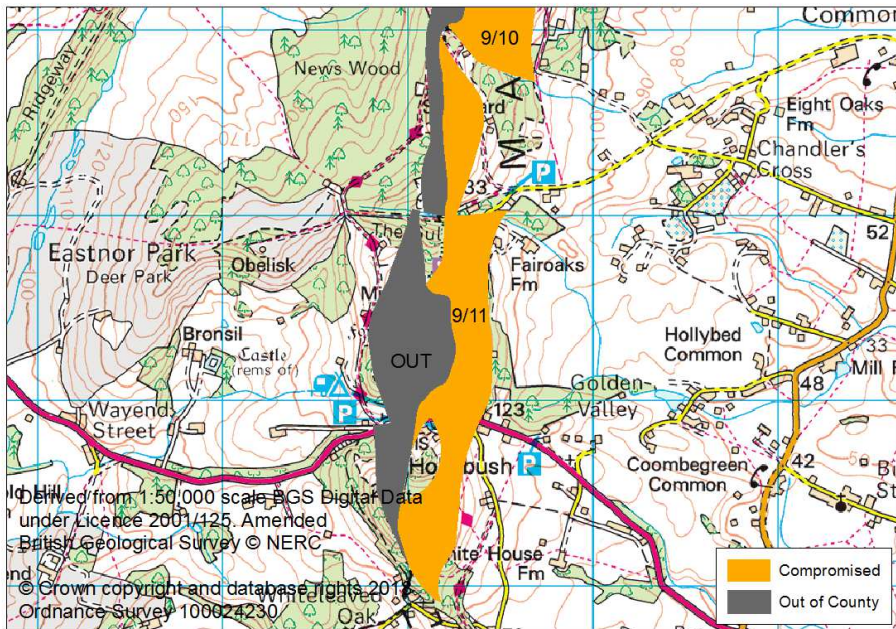
Resource description:	
Resource description:	2 nd terrace (Worcester) sand and gravel. The upper part of the 2 nd terrace deposit is typically more sandy than the lower and may give a misleading impression of the gravel content. There is no information on depth in this area.
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small deposit with small-scale dispersed development across the resource area.
Crude estimate of resource:	Depth not known.
Conclusion:	Not significant: Small deposit with no information to estimate the resource in this area. Not for consideration in defining areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	No change to the assessment.
Conclusion:	Not significant.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
Not reassessed due to resource not being classified as Key or Significant in the Third Stage Consultation	

Overview	
Resource number:	9/10
Resource name:	North Hill to Hangman's Hill
Resource area:	463 ha
Resource depth:	Estimated 1658m, maximum working depth estimated 150m
Location	
OS sheet reference:	SO 74 NE, SO 74 SE
National grid ref:	376863, 243606
	
Resource description:	
Resource description:	<p>Malverns complex and Warren House formation (crushed rock). The Malverns Complex of Precambrian age rock forms the Malvern Hills which straddle the border between Worcestershire and Herefordshire. The Complex comprises mainly intrusive igneous rocks. These include diorites and tonalities, with minor granites and ultrabasic rocks. Many of the rocks are extensively sheared and are cut by microdiorite dykes and granite pegmatites.</p> <p>The BGS geological map¹ indicates that in some areas of the Malvern Hills, the pre-Cambrian rock is an estimated 3000m deep (at Worcestershire Beacon). However, the geological map indicates that, due to faulting, the depth of pre-cambrian rock is likely to be much less than this at the southern end of the range, and indicates roughly 200m depth at Herefordshire Beacon. The memoir for Worcester reports that the Collington Borehole (18km north-west of this resource area, in Herefordshire) did not reach the pre-Cambrian basement until 1710m but that seismic readings suggested this should have been 1800m.</p> <p>The intrusive Malvern rocks were widely used for roadstone and building stone in and around Malvern for much of the 19th and 20th centuries. The Malvern Hills Conservators (a locally elected body charged with the ownership and care of the Hills) have been granted a number of local Acts of Parliament which included the right to compulsory purchase quarries. As a result of these Acts and Appeal decisions by the Secretary of State the last quarry in Worcestershire, at Tank (Pyx) quarry, closed in 1969.</p>

¹ Cross-sections shown on the 1:50000 Series England and Wales Sheet 199, Worcester, Solid and Drift Geology)

	Estimated resource depth could be based on the average of a) 3000m at Worcestershire Beacon b) 200m at Herefordshire Beacon and c) Borehole at Collington (median average 1710m to 1800m): 1775 = 1658m but as the deepest quarry in Europe is 142m deep (Rubislaw Quarry, Aberdeen) it is considered sensible to calculate resource potential based on a maximum depth of 150m.
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A large resource area with little built development. This deposit extends beyond the county boundary into Herefordshire.
Crude estimate of resource:	Area: 463 ha x average depth: 150 m ÷ 2 Estimated resource volume: 347,250,000 m ³ Estimated resource tonnage (at 2.7 t/m³): 937,575,000 tonnes
Conclusion:	Significant – key resource. Use to define areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 463 ha x average depth: 150 m ÷ 2 Estimated resource volume: 347,250,000 m ³ Estimated resource tonnage (at 2.45 t/m³): 850,762,500 tonnes
Conclusion:	Significant – key resource.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none"> - Ancient Semi-Natural Woodland - Area of Outstanding Natural Beauty - Conservation Area - Listed Building - Settlement Boundary - Site of Special Scientific Interest - Source Protection Zone
Conclusion:	Key resource

Overview	
Resource number:	9/11
Resource name:	Hollybush, Midsummer and Swinyard Hills
Resource area:	64 ha
Resource depth:	Estimated 200m maximum working depth estimated 150m
Location	
OS sheet reference:	SO 73 NE
National grid ref:	376251, 237336

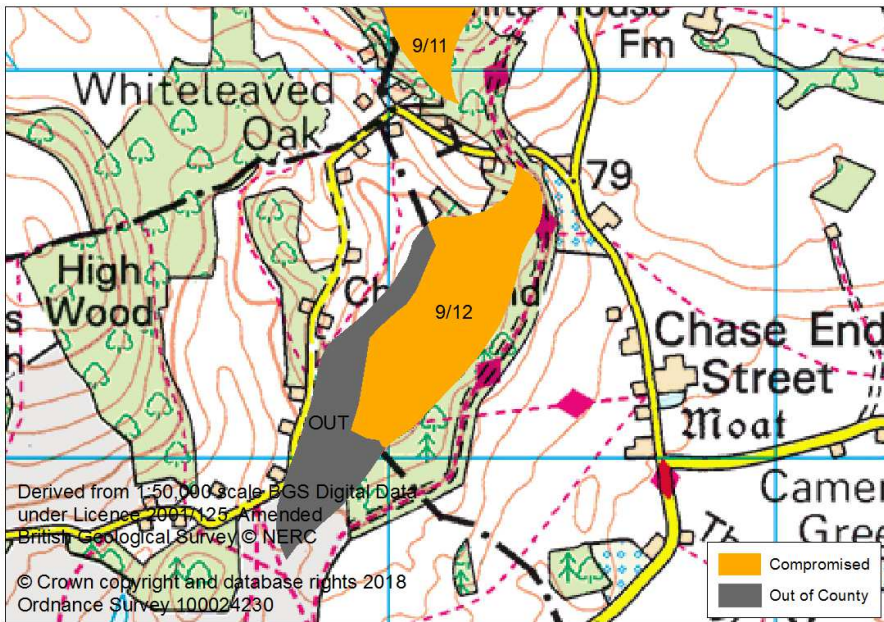


Resource description:	
Resource description:	<p>Malverns complex (crushed rock). The Malverns Complex of Precambrian age rock forms the Malvern Hills which straddle the border between Worcestershire and Herefordshire. The Complex comprises mainly intrusive igneous rocks. These include diorites and tonalities, with minor granites and ultrabasic rocks. Many of the rocks are extensively sheared and are cut by microdiorite dykes and granite pegmatites.</p> <p>The intrusive Malvern rocks were widely used for roadstone and building stone in and around Malvern for much of the 19th and 20th centuries. The Malvern Hills Conservators (a locally elected body charged with the ownership and care of the Hills) have been granted a number of local Acts of Parliament which included the right to compulsory purchase quarries. As a result of these Acts and Appeal decisions by the Secretary of State the last quarry in Worcestershire, at Tank (Pyx) quarry, closed in 1969.</p> <p>The BGS geological map² indicates that the depth of pre-cambrian rock is roughly 200m depth at Herefordshire Beacon, a little to the north of this resource area.</p> <p>(Estimated resource depth could be based on 200m depth at Herefordshire Beacon, but as the deepest Quarry in Europe is 142m deep (Rubislaw Quarry, Aberdeen it is considered sensible to calculate resource potential based on a maximum depth of 150m)</p>

² Cross-sections shown on the 1:50000 Series England and Wales Sheet 199, Worcester, Solid and Drift Geology)

Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small resource area with little built development. This deposit extends beyond the county boundary into Herefordshire.
Crude estimate of resource:	Area: 64 ha x average depth: 150m ÷ 2 Estimated resource volume: 48,000,000 m ³ Estimated resource tonnage (at 2.7 t/m³): 129,600,000 tonnes
Conclusion:	Significant – key resource. Use to define areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 64 ha x average depth: 150m ÷ 2 Estimated resource volume: 48,000,000 m ³ Estimated resource tonnage (at 2.45 t/m³): 117,600,000 tonnes
Conclusion:	Significant – key resource.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none"> - Ancient Semi-Natural Woodland - Area of Outstanding Natural Beauty - Listed Building - Site of Special Scientific Interest
Conclusion:	Key resource

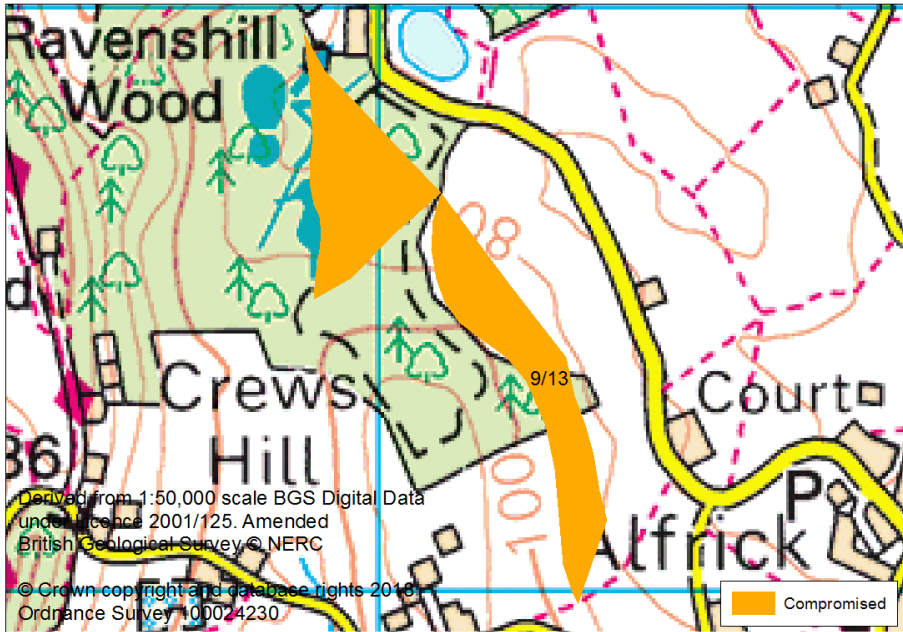
Overview	
Resource number:	9/12
Resource name:	Chase End Hill
Resource area:	15 ha
Resource depth:	Estimated 200m maximum working depth estimated 150m
Location	
OS sheet reference:	SO 73 NE
National grid ref:	376150, 235374



Resource description:	
Resource description:	<p>Malverns complex (crushed rock). The Malverns Complex of Precambrian age rock forms the Malvern Hills which straddle the border between Worcestershire and Herefordshire. The Complex comprises mainly intrusive igneous rocks. These include diorites and tonalities, with minor granites and ultrabasic rocks. Many of the rocks are extensively sheared and are cut by microdiorite dykes and granite pegmatites.</p> <p>The intrusive Malvern rocks were widely used for roadstone and building stone in and around Malvern for much of the 19th and 20th centuries. The Malvern Hills Conservators (a locally elected body charged with the ownership and care of the Hills) have been granted a number of local Acts of Parliament which included the right to compulsory purchase quarries. As a result of these Acts and Appeal decisions by the Secretary of State the last quarry in Worcestershire, at Tank (Pyx) quarry, closed in 1969.</p> <p>The BGS geological map³ indicates that the depth of pre-cambrian rock is roughly 200m depth at Herefordshire Beacon, 4km to the north of this resource area.</p> <p>Estimated resource depth could be based on 200m depth at Herefordshire Beacon, but as the deepest Quarry in Europe is 142m deep (Rubislaw Quarry, Aberdeen) it is considered sensible to calculate resource potential based on a maximum depth of 150m)</p>
Assessment of resource for the second consultation on MLP (Autumn 2013)	

³ Cross-sections shown on the 1:50000 Series England and Wales Sheet 199, Worcester, Solid and Drift Geology)

Commentary:	A small resource area with little built development. This deposit extends beyond the county boundary into Herefordshire.
Crude estimate of resource:	Area: 15 ha x average depth: 150 m ÷ 2 Estimated resource volume: 11,250,000 m ³ Estimated resource tonnage (at 2.7 t/m³): 30,375,000 tonnes
Conclusion:	Significant – key resource. Use to define areas of search.
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	Area: 15 ha x average depth: 150 m ÷ 2 Estimated resource volume: 11,250,000 m ³ Estimated resource tonnage (at 2.45 t/m³): 27,562,500 tonnes
Conclusion:	Significant – key resource.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	
Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none"> - Ancient Semi-Natural Woodland - Area of Outstanding Natural Beauty - Site of Special Scientific Interest
Conclusion:	Key resource

Overview		
Resource number:	9/13	
Resource name:	Ravenshill Wood	
Resource area:	10 ha	
Resource depth:	Estimated 15m	
Location		
OS sheet reference:	SO 75 SW	
National grid ref:	374117, 253519	
Resource description:		
Resource description:	Woolhope Limestone Formation (crushed rock). In this area, the formation ranges from about 6m to 18m in thickness, although the BGS memoirs state that over much of its outcrop it maintains a relatively uniform thickness of about 15m, perhaps thinning regionally northwards from 17m in the Colwall Tunnel. The minimum thickness of 6m was recorded in a disused quarry at Merryhill Common, Storridge. (Estimated depth based on the relatively uniform thickness of 15m)	
Assessment of resource for the second consultation on MLP (Autumn 2013)		
Commentary:	A small resource area with no built development.	
Crude estimate of resource:	Area: 10 ha x average depth: 15 m ÷ 2 Estimated resource volume: 750,000 m ³ Estimated resource tonnage (at 2.7 t/m³): 2,025,000 tonnes	
Conclusion:	Significant – key resource. Use to define areas of search.	
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)		
Revised estimate of resource:	Area: 10 ha x average depth: 15 m ÷ 2 Estimated resource volume: 750,000 m ³ Estimated resource tonnage (at 2.45 t/m³): 1,837,500 tonnes	
Conclusion:	Significant – key resource.	
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)		

Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none">- Ancient Semi-Natural Woodland- Area of Outstanding Natural Beauty
Conclusion:	Key resource

Overview	
Resource number:	9/14
Resource name:	Alfrick Pound
Resource area:	17 ha
Resource depth:	Estimated 15m
Location	
OS sheet reference:	SO 75 SW
National grid ref:	374525, 252183

Resource description:	
Resource description:	<p>Woolhope Limestone Formation (crushed rock). In this area, the formation ranges from about 6m to 18m in thickness, although the BGS memoirs state that over much of its outcrop it maintains a relatively uniform thickness of about 15m, perhaps thinning regionally northwards from 17m in the Colwall Tunnel. The minimum thickness of 6m was recorded in a disused quarry at Merryhill Common, Storridge.</p> <p>(Estimated depth based on the relatively uniform thickness of 15m)</p>
Assessment of resource for the second consultation on MLP (Autumn 2013)	
Commentary:	A small resource area with no built development.
Crude estimate of resource:	<p>Area: 17 ha x average depth: 15 m ÷ 2</p> <p>Estimated resource volume: 1,275,000 m³</p> <p>Estimated resource tonnage (at 2.7 t/m³): 3,442,500 tonnes</p>
Conclusion:	<p>Significant – key resource.</p> <p>Use to define areas of search.</p>
Assessment of resource for the Third Stage consultation on MLP (Spring 2015)	
Revised estimate of resource:	<p>Area: 17 ha x average depth: 15 m ÷ 2</p> <p>Estimated resource volume: 1,275,000 m³</p> <p>Estimated resource tonnage (at 2.45 t/m³): 3,123,750 tonnes</p>
Conclusion:	Significant – key resource.
Assessment of resource for the Fourth Stage consultation on MLP (August 2018)	

This resource area has been split into areas 9/14 and 9/14b.			
Resource area 9/14		Resource area 9/14b	
Resource area:	8 ha	Commentary:	Screened out due to the following appendix A criterion: <ul style="list-style-type: none"> - Ancient Semi-Natural Woodland - Area of Outstanding Natural Beauty - Listed Buildings - Site of Special Scientific Interest
Resource depth:	Estimated 15m		
Revised estimate of resource:	Area: 8 ha x average depth: 15m ÷ 2 Estimated resource volume: 600,000 m ³ Estimated resource tonnage (at 2.45 t/m³): 1,470,000 tonnes		
Conclusion:	Significant resource	Conclusion:	Compromised