

Oxfordshire Minerals and Waste Local Plan

Part 1 – Core Strategy

Proposed Submission Document

Topic Paper

Oxfordshire Water Environment

August 2015

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1. Introduction

- 1.1 This topic paper supports the Oxfordshire Minerals and Waste Local Plan: Part 1 – Core Strategy Proposed Submission Document August 2015. It may be further updated when the plan is submitted for independent examination by a government appointed Inspector.
- 1.2 The Minerals and Waste Local Plan: Part 1 – Core Strategy is referred throughout this document as OMWLP-CS. It makes provision for the development that will be needed for the supply of minerals and management of waste in Oxfordshire in the period to 2031. The Proposed Submission Document has been developed from an earlier version of OMWLP-CS that had been submitted to the Secretary of State in 2012 but which was withdrawn in July 2013 prior to examination¹. Part 2 of the Oxfordshire Minerals and Waste Local Plan – Site Allocations (referred to as OMWLP-SA) will be prepared following the adoption of OMWLP-CS.
- 1.3 A previous version of this topic paper was published to accompany the earlier (2012) version of OMWLP-CS, and set out information relevant to flooding and the water environment and the considerations that were relevant to minerals and waste planning. It explained how relevant policies had been developed – in particular M4 (Working of Aggregate Minerals), C3 (Flooding) and C4 (Water Environment).
- 1.4 This version of the topic paper covers the same ground, focussing on the period since July 2013 and the consultation that took place on a Draft Plan in February 2014².
- 1.5 A Strategic Flood Risk Assessment (SFRA)³ provides a detailed assessment of the possible impact of flooding on areas that are identified in the OMWLP-CS for possible future development. The SFRA examines the impact of possible development from fluvial flooding, surface water flooding and groundwater flooding. This topic paper should be read in conjunction with the SFRA which includes detailed mapping of the relevant areas.

¹ The circumstances are explained in a report to full Council on 7 July 2013: see <https://www.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/planning/mineralsandwaste/ReportCountyCouncil09July2013Minerals%26WasteCoreStrategy.pdf>

² The Oxfordshire Minerals and Waste Local Plan: Core Strategy Consultation Draft February 2014

³ Oxfordshire County Council Minerals and Waste Level 1 Strategic Flood Risk Assessment: AECOM Water Final Report August 2015

2. Oxfordshire Water Environment

2.1 The River Thames flows through Oxfordshire from Gloucestershire in the west and eventually forms the south east boundary with neighbouring Berkshire. The principal tributaries are the rivers Windrush, Evenlode, Cherwell and Thame, but there are several others. Figure 1 shows the relationship of key rivers to the county's sand and gravel resource, which are mostly found in the river terraces along the Thames and its tributaries. Figure 2 shows the crushed rock resources and the main rivers. As well as performing a key drainage function, the main rivers make an important contribution to the county's landscape and visual amenity.

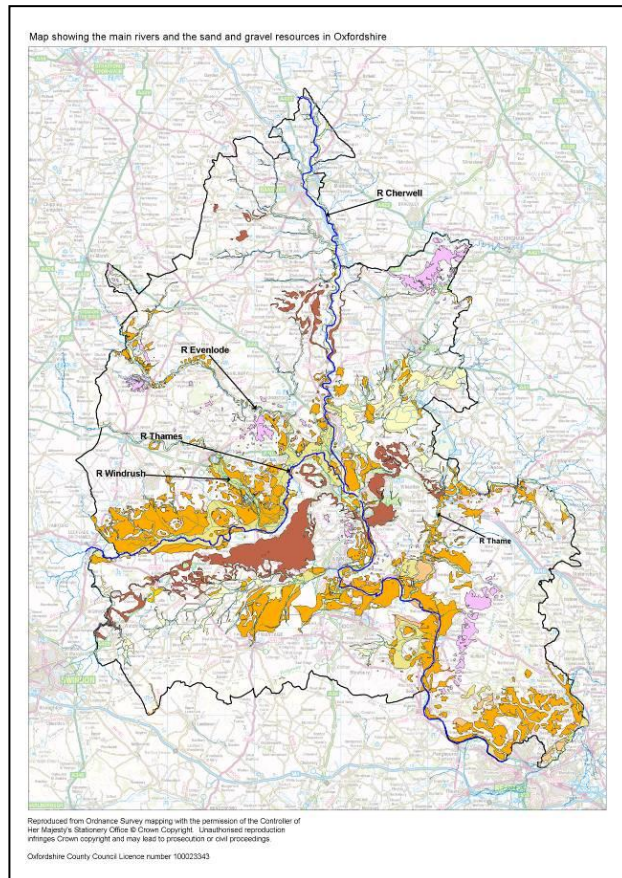
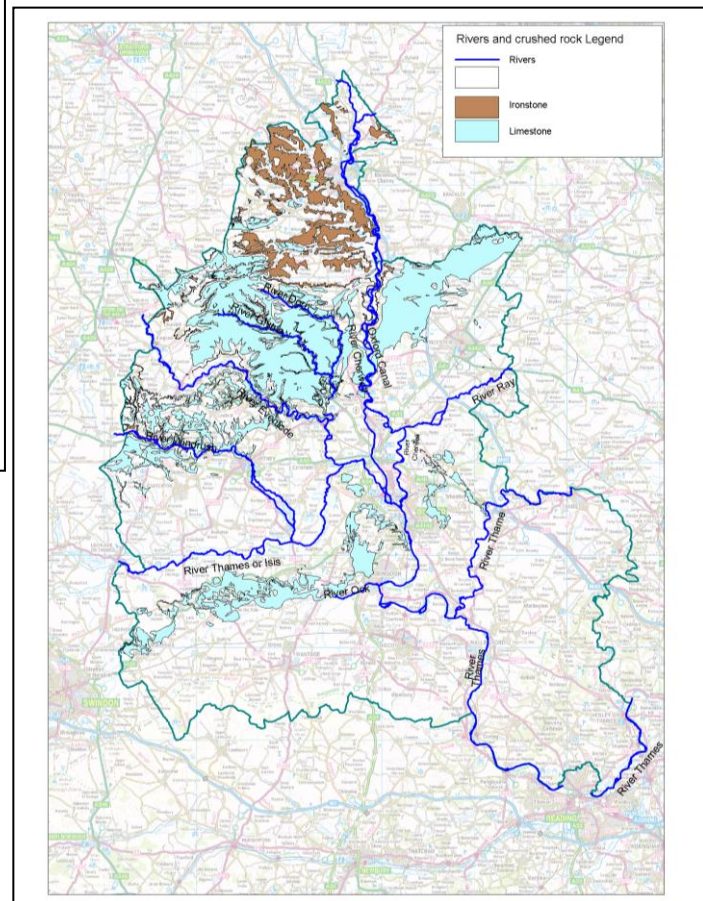


Figure 2 Rivers and crushed rock resources in Oxfordshire

Figure 1 Rivers and sand and gravel resources in Oxfordshire



2.2 Figure 3 shows areas at most risk of flooding from rivers (generally referred to as areas in Flood Zone 3). Extensive fluvial flooding affected parts of Oxfordshire, including Oxford, Abingdon and Witney, in July 2007 and January 2013. Flooding also occurs from over-topping of the Oxford Canal which follows the course of the river Cherwell between Oxford and Banbury and leaves the county in the north, passing into neighbouring Warwickshire.

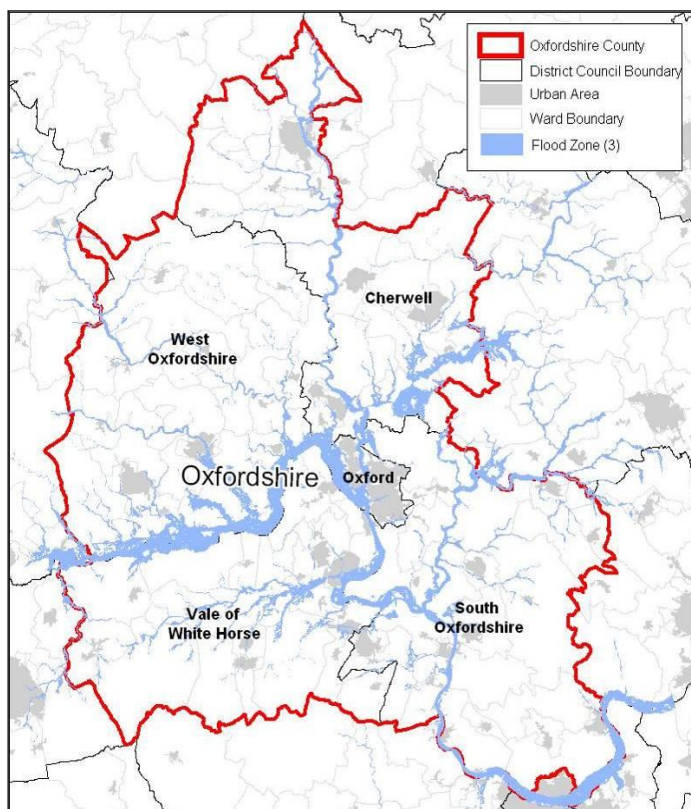


Figure 3
The extent of flood zone 3 in
Oxfordshire

Source: Environment Agency

2.3 Records from the Radcliffe Observatory show temperatures in Oxford in the post-1986 decade are the warmest on record by a considerable margin. This may be indicative of climate change, which could have significant impacts on Oxfordshire’s environment, economy, transport, housing and health. Climate change in Oxfordshire is likely to result in warmer, drier summers, with temperatures predicted to increase by 1.0°C to 1.5°C by 2020 and rainfall predicted to decrease between 10 and 20% by 2020 in summers; and milder, wetter winters with an increased risk of flooding⁴.

⁴ Oxfordshire 2030 Sustainability Community Strategy

3. Legislation and Policy

3.1 European Policy

Water Framework Directive (December 2000)

3.1.1 The Water Framework Directive (WFD) came into force in December 2000 and establishes a new integrated approach to the protection, improvement and sustainable use of Europe's rivers, lakes, estuaries, coastal waters and groundwater. The directive requires that all member states manage their inland and coastal water bodies so that a good status is achieved by 2015. This aims to provide substantial long term benefits for sustainable management of water.

3.2 National Policy

Flood Risk Regulations 2009

3.2.1 The County Council is the Lead Local Flood Authority and is required to undertake a Preliminary Flood Risk Assessment for Oxfordshire, considering the impact of flooding from local sources (surface runoff, groundwater and ordinary watercourses). A Preliminary Assessment Report was published in June 2011, containing information on sources and incidents of flooding and concluding that there are no indicative Flood Risk Areas in the County – as defined by Defra (a single area where more than 30,000 people might be affected by flooding).

3.2.2 The Preliminary Assessment Report was informed by an earlier SFRA⁵. But it is a high level assessment and does not contain information at the level of detail of the SFRA. Nevertheless, it is of relevance in any assessment of flood risk from potential development.

Flood and Water Management Act 2010

3.2.3 This Act brings into law a number of the recommendations made in the Pitt Review (2008). County Councils were designated as Lead Local Flood Authorities under this Act and are required to prepare a Local Flood Risk Management Strategy.

3.2.4 The Oxfordshire Flood Risk Management Strategy was published in December 2014 and sets out the County Council's approach to the management of flood risk from fluvial, surface water and groundwater sources. It raises awareness of the role played by agencies responsible for flooding and sets out principles for future management, including:

- Promoting the use of more sustainable drainage systems to reduce flood risk;
- Encouraging new development only where flood risk is low and away from flood risk areas;
- Encouraging self-help and ensuring that people have appropriate and timely information;
- Improved understanding by Riparian land owners of their responsibilities.

⁵ Oxfordshire County Council Minerals and Waste Development Framework Level 1 – Strategic Flood Risk Assessment: Scott Wilson 'Living Document' October 2010

National Planning Policy

- 3.2.5 The NPPF advises that ‘inappropriate development’ in areas at risk of flooding should be avoided by directing development away from ‘areas of highest risk’. Where development is necessary in higher risk areas, it should be made safe without increasing flood risk elsewhere. Detailed guidance includes advice on the definition of Flood Zones to help identify areas of ‘highest risk’.

FLOOD ZONES

Flood Zone 1: Low probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%). All uses of land are appropriate in this zone.

Flood Zone 2: Medium probability. This zone comprises land as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%). Water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure are appropriate in this zone.

Flood Zone 3a: High Probability. This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%). Water-compatible and less vulnerable uses of land are appropriate in this zone. More vulnerable uses may be appropriate in this zone if an exception test is passed.

Flood Zone 3b: Functional flood plain. Water – compatible uses and essential infrastructure that has to be there are the only uses permitted in this zone.

Source: National Planning Guidance on Flood Risk and Coastal Change (updated 15.04.2015)

- 3.2.6 The SFRA provides more detail on national policy, including application of the Sequential Test for minerals and waste development. This test aims to steer new development to areas with the lowest probability of flooding using data provided by the SFRA. Development should not be considered if there are “reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding”.

National Planning Policy for Waste

- 3.2.7 Published in October 2014 to replace Planning Policy Statement 10 (Planning for Sustainable Waste Management) this policy expects that the suitability of sites or areas for new or enhanced waste management facilities will be assessed against a number of criteria, including:

Protection of water quality and resources and flood risk management
Considerations will include the proximity of vulnerable surface and groundwater or aquifers. For landfill or land-raising, geological conditions and the behaviour of surface water and groundwater should be assessed both for the site under consideration and the surrounding area. The suitability of locations subject to flooding, with consequent issues relating to the management of potential risk posed to water quality from waste contamination, will also need particular care.

3.3 Regional Planning Policy

- 3.3.1 The South East Plan was revoked in March 2013, however it informed preparation of the earlier stages of the plan and guided policy formation prior to its revocation.

3.4 Local Planning Policy

- 3.4.1 The Oxfordshire Minerals and Waste Local Plan was adopted in 2006 and contains saved policies on Groundwater (PE4) and the Floodplain (PE7).

PE4 (Groundwater)

Proposals for mineral extraction and restoration (including waste disposal) will not be permitted where they would have an impact on groundwater levels in the surrounding area which would harm existing water abstraction, river flow, canal, lake or pond levels or important natural habitats. Proposals must not put at risk the quality of groundwater.

PE7 (Floodplain)

In the floodplain proposals for mineral extraction and restoration should not result in the raising of existing ground levels. Mineral extraction or restoration by landfill should not adversely affect groundwater levels or water quality, impede flood flows, reduce the capacity of flood storage or adversely affect existing flood defence structures. The developer and/or landowner will be expected to undertake any hydrological surveys necessary to establish the implications of the proposal.

- 3.4.2 The Minerals and Waste Local Plan also includes a Code of Practice which is cross-referred to in policy P18 (determination of planning applications). The Code of Practice contains guidance on Floodplain Protection (paragraph 31) as follows:

“The County Council will consult the Environment Agency on proposed mineral working and waste disposal in the floodplain. Generally stockpiles and storage of material screening bunds and the final restored landform should not impede the flow of water or reduce the storage capacity of floodwater. The Environment Agency does not generally accept disposal of waste by landfill into the floodplain unless the material is wholly inert. THE NRA publication ‘Policy and Practice for the Protection of Groundwater’ (1992) provides more detailed information (in April 1996 the Environment Agency took over the functions of the NRA).”

- 3.4.3 District Council Local Plans also contain policies on flooding.

4. Minerals and Waste Development and the Water Environment

- 4.1 Much of the development, particularly mineral working, provided for by OMWLP-CS will take place in rural areas and may raise practical implications for the water environment as well as affecting the landscape and biodiversity through the creation of water bodies.

Minerals

- 4.2 OMWLP-CS identifies the amount of aggregate mineral that is forecast to be required from local production over the plan period⁶ and principal locations from which extraction may take place. Much of the county's sand and gravel resource lies within the river valleys (in areas liable to flood). Although defined as 'water compatible development' the NPPF still expects a sequential test to be undertaken to identify the extent to which the need for mineral might be met from areas outside the floodplain (FZ1).
- 4.3 The SFRA provides guidance on how sequential testing should inform the OMWLP-CS and how the exercise should be undertaken. Section 5 applies the Sequential Test to options identified as broad locations that may be suitable for sand and gravel working as these are generally located in areas of potential flood risk. The map at Appendix 1 shows the boundary of each area and Appendix 5 provides details of the assessment. Deposits of soft sand and crushed rock are generally found in areas that are far less liable to flood. A sequential test has nevertheless been undertaken of the broad location options and the results also included in Appendix 5. Section 6 goes on to confirm the level of flood risk associated with the areas now identified in OMWLP-CS as the principal locations for future extraction.
- 4.4 Minerals development can also impact on ground water levels, quality and flows. General policies on flooding and groundwater have been developed to help steer development and ensure that relevant issues are properly considered before planning permission is granted. Section 7 describes how these policies have been developed.

Waste

- 4.5 The SFRA does not identify a need for the release of substantial areas of land for waste development in areas liable to flood. The waste hierarchy now reduces disposal of waste in landfill to the option of last resort. As more waste is recycled or treated, waste management needs are changing to a number of sites that require a much smaller land take than that required for landfill or for mineral extraction. OMWLP-CS identifies a spatial strategy to steer new waste development (both strategic and non-strategic installations). Broad areas suitable for such development are identified and the release of land in the flood plain is

⁶ Oxfordshire County Council Local Aggregate Assessment November 2014

not required in order to provide sufficient waste development sites within these areas. Evidence of this is provided in the updated SFRA.

- 4.6 The SFRA has helped to identify that sequential testing of the broad areas for waste development would not provide benefit to plan development at this stage. But sequential testing will be required for any sites that are identified in OMWLP-SA and for any proposals that come forward as part of a planning application.

5. Sequential Testing of Mineral Options

Sand and Gravel

- 5.1 The eighteen resource area options for sand gravel extraction (see map at Appendix 1 and area descriptions in Appendix 4) were identified in the early stages of plan preparation⁷ and their potential flood risk characteristics assessed in the earlier SFRA⁸. The earlier version of this Topic Paper undertook a sequential test of these options using that information. It was found that areas at lowest risk of flooding generally had a much lower potential to deliver the mineral requirement set out in the plan. The areas at lower risk of flooding were found to be those containing the more variable and generally thinner glacial sand and gravel deposits on higher ground. Their inability to meet plan need was reinforced by the fact that no interest had been expressed by operators to work these areas. The preferred spatial strategy set out in the Draft Plan (February 2014) was therefore based on refined resource areas using river valley deposits, notwithstanding that these were acknowledged to be in areas of higher flood risk.
- 5.2 Since the publication of the earlier SFRA, the Environment Agency has made revisions to some of the flood risk data and a study was undertaken in March 2015⁹ to identify the scale of any change affecting any of the resource area options. The study looked at the most up to date fluvial, surface water and groundwater flooding data. Using a threshold of +/- 5% as a guide, the study found one area where there was any noticeable increase in flood risk and two areas where there was a noticeable decrease.
- 5.3 Appendix 5 presents a revised assessment for each of the original option areas using data from the updated SFRA (August 2015). This shows the proportion of each area that lies within Flood Zones 1, 2 and 3 and the proportion of the deliverable part of each area (as measured by operator site nominations) that lies within each Flood Zone. The table also contains a brief assessment of other planning factors that have been weighed against flood risk in determining the suitability of each area to be considered as an option for future extraction.
- 5.4 The results are not strictly comparable with the assessment undertaken in the previous Topic Paper because there have been changes to site nominations made by operators in the intervening period. Nevertheless the results, summarised below and emphasising the amount of the deliverable area that lies within Flood Zone 1, are broadly similar. In only one case (Resource Area 13) has there been a change in the assessment (from green to yellow) but this is very marginal.

⁷ See Topic Paper on Development of the Minerals Planning Strategy (in preparation)

⁸ In 2009 a Level 1 SFRA for the northern part of the county was prepared and this was enlarged in 2010 to cover the entire county.

⁹ Oxfordshire County Council Minerals and Waste SFRA GIS Inspection (AECOM) Final Report March 2015

Table 1: Sand and Gravel Resource Areas: Summary of Flood Risk

Resource Area	Number of sites	% FZ 1 (deliverable area)	RAG status (flooding)
RAS 1	0	N/A	
RAS 2	0	N/A	
RAS 3	0	N/A	
RAS 4	3	62%	
RAS 5	8	40%	
RAS 6	7	35%	
RAS 7	0	N/A	
RAS 8	0	N/A	
RAS 9	3	27%	
RAS 10	0	N/A	
RAS 11	0	N/A	
RAS 12	2	24%	
RAS 13	4	46%	
RAS 14	3	82%	
RAS 15	1	N/A	
RAS 16	2	0%	
RAS 17	0	N/A	
RAS 18	1	15%	

Key

	Up to 25% deliverable area in FZ 1 and more than 75% deliverable area in FZ 3
	20-50% deliverable area in FZ 1 and 30-75% deliverable area in FZ 3
	More than 50% in FZ 1 and less than 30% in FZ 3

5.5 With the exception of Option Resource Area 14, it remains the case that there are no site nominations in the resource areas at least risk of flooding. A key requirement of the planning process is that plans must be deliverable, and the only conclusion that can be drawn is that extraction will need to take place in areas that are at some risk of flooding. The NPPF does allow for this, recognising that sand and gravel working should be seen as “water compatible development” that can be undertaken in flood zone 3 if necessary¹⁰.

5.6 Since the publication of the Draft Minerals and Waste Local Plan in February 2014, the amount of additional sand and gravel working that needs to be planned for has been reviewed¹¹ and has reduced (from 7.87 to 5.37 million tonnes). Nevertheless, even if all other planning

¹⁰ That most workable sand and gravel resources are in river valleys that are generally also areas of high flood risk is not a situation unique to Oxfordshire.

¹¹ Oxfordshire Local Aggregate Assessment November 2014

constraints were ignored and a spatial strategy determined on the basis of flood risk alone, there are insufficient sites in the areas assessed at being of lowest flood risk to be able to deliver the requirement.

Table 2: Sequential Test Outcome – Sharp Sand and Gravel

Flood risk	Number of resource areas	Number of Nominated Sites	Conclusion
	10	4	The yield from available sites in these resource areas would not meet the total requirement.
	7	28	The yield from available sites in these resource areas could more than meet the total requirement. Relative flood risk can still be taken into account in identifying specific sites in the Part 2 Plan.
	1	2	The resource that can be provided from this category is not needed to meet the required yield. However, there are other planning factors that favour not ruling out the area from further consideration.
Total	18	34	

Soft Sand

5.7 Appendix 5 shows that the only resource area option originally identified (RASS 1) is an area of very low flood risk and that 99% of the deliverable area is in Flood Zone 1. The plan seeks to provide for an additional 1.24 million tonnes of mineral during the plan period and there are seven sites in RASS 1 from which this can be delivered.

Crushed Rock

5.8 Appendix 5 shows that all of the five resource area options are areas of very low flood risk with 100% of the deliverable resource in Flood Zone 1. The plan does not identify a need for additional provision for working of crushed rock.

6. Assessment of the “Principal Locations” for Working Aggregate Minerals

- 6.1 A separate Topic Paper¹² on Development of the Minerals Planning Strategy and the Preliminary Assessment of Minerals Site Nominations help to explain how the minerals spatial strategy has developed. The eight “Principal Locations” for working aggregate minerals (identified in policy M3 of OMWLP-CS) are shown on the OMWLP-CS Minerals Key Diagram (see Appendix 6).
- 6.2 The Sequential Test undertaken in this Paper (section 5) reinforces the conclusion reached earlier in the plan making process that sharp sand and gravel development in areas of higher flood risk cannot be avoided. The “Principal Locations” for working sharp sand and gravel have therefore been determined by other planning factors. The table in Appendix 5 advises on the extent to which the “Principal Locations” for working aggregate minerals overlap with the resource area options and provides an indication of the extent to which flood risk has been balanced against other planning factors in selecting the principal locations.
- 6.3 Appendix 7 provides an assessment of each of the “Principal Locations” using data from the SFRA August 2015 in the same form as that used in Appendix 5 for the sequential testing of the resource area options. The results are summarised in table 3 below. Individual assessments for the sites nominated in each area are in Appendix G of the SFRA August 2015 and will need to be taken into account in detailed site assessment for Part 2 of the Plan (OMWLP-SA).

Table 3: Principal Locations for sand and gravel: Summary of Flood Risk

No.	Plan Area	Geographic Location	Total Land in FZ1	Total Nominated area in FZ1	Guide* + no. of sites
CS4	Thames Valley – Caversham to Shiplake	East of Reading	2%	0%	1
CS5a	Thames, Lower Thames Valley – Oxford to Cholsey	East of Abingdon	33%	35%	2
CS5b	Thames, Lower Thames Valley – Oxford to Cholsey	Shillingford area	61%	46%	3
CS5c	Thames, Lower Thames Valley – Oxford to Cholsey	Benson area	49%	0%	1
CS5d	Thames, Lower Thames Valley – Oxford to Cholsey	Wallingford/ Cholsey area	49%	35%	3
CS5e	Thames, Lower Thames Valley – Oxford to Cholsey	Culham area	75%	82%	3
CS6	Thames, Lower Windrush and Evenlode Valleys	East of Witney	36%	37%	11

See Table 1 for Key

¹² Topic Paper on Development of the Minerals Planning Strategy (in preparation)

7. Development of Plan Policies for the Water Environment

Policy C3: Flooding (previously Policy C1)

- 7.1 Following discussion with the Environment Agency, a policy on flooding was first included in the Minerals Planning Strategy and Waste Planning Strategy Consultation Drafts (September 2011) as Policy C1.

Policy C1: Minerals and waste development will, wherever possible, take place in areas that are not at risk of flooding. Where development takes place in an area of identified flood risk this should only be where alternative locations in areas of lower flood risk have been explored and discounted, and where a flood risk assessment is able to demonstrate that the development will not:

- *Impede the flow of flood water;*
- *Displace floodwater and increase the risk of flooding elsewhere;*
- *Reduce existing flood water capacity;*
- *Adversely affect the functioning of existing flood defence structures.*

Proposals for the restoration of quarries located in areas liable to flood should, where possible, incorporate measures for the storage of floodwater.

- 7.2 Supporting text explained that, except for certain types of landfill, minerals and waste development may take place in areas at risk of flooding, subject to undertaking a sequential test and a specific flood risk assessment. For minerals development that takes place in the flood plain, associated development (stockpiles, buildings and plant etc) should be located on parts of the site that pose least risk to flooding. It was also pointed out that mineral working in the flood plain may offer benefits through increasing flood water storage capacity and reducing the risk of flooding elsewhere.
- 7.3 The following points were made in responses to the consultation¹³:
- the emphasis on fluvial flooding needed to be balanced with risk from other forms of flooding;
 - greater clarity should be provided on the categories of flood risk associated with minerals and waste development;
 - a clearer distinction is required between the flood risk associated with the working of minerals and the processing of minerals;
 - no need to repeat advice in national policy on sequential testing for sand and gravel development because sand and gravel working is already confirmed as ‘water compatible’ development;
 - the Caversham area is inappropriate for mineral working because the area is in the functional flood plain and the

¹³ All responses to the 2011 consultations are included on the council website <https://www.oxfordshire.gov.uk/cms/content/minerals-and-waste-core-strategy#responsesto2011consultation>

opportunity to locate associated development on land outside the floodplain extremely limited.

- 7.4 Following discussion with the Environment Agency, the policy was amended for inclusion in the previous Core Strategy Proposed Submission Document (May 2012).

Policy C1: Minerals and waste development will, wherever possible, take place in areas that are not at risk of flooding. Where development takes place in an area of identified flood risk this should only be where alternative locations in areas of lower flood risk have been explored and discounted (using the Sequential Test and Exceptions Test as necessary) and where a flood risk assessment is able to demonstrate that the risk of flooding from all sources is not increased, including:

- *Any impediment to the flow of floodwater;*
- *The displacement of floodwater and increased risk of flooding elsewhere;*
- *Any reduction in existing floodwater storage capacity;*
- *An adverse effect on the functioning of existing flood defence structures.*

- 7.5 The encouragement previously given to increasing flood storage capacity in the floodplain through mineral working was moved to policy M7 on Restoration of mineral workings (now policy M10). The Supporting Text was revised to address other comments on the earlier consultation. In particular two tables were added as appendices to the Core Strategy to confirm the level of flood risk associated with different types of mineral and waste development. Supporting Text was also added to emphasise the difference between mineral working and mineral processing in terms of flood risk. Content was also added on the issues arising from the use of waste material to restore mineral workings in the floodplain.

- 7.6 The amendments appeared to have addressed most of the objections to the September 2011 draft, but concerns were still being expressed¹⁴ on the extent to which the policy adequately addressed the level of flood risk associated with particular types of development – in particular waste brought in to restore mineral workings in the flood plain.

- 7.7 Following withdrawal of the previous (2012) Core Strategy, some amendment was made to the policy in the light of the comments that had been made and the adjusted policy, renumbered as policy C3, was included in the consultation draft OMWLP-CS, February 2014.

¹⁴ A summary of all the representations is on the council website <https://www.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/planning/mineralsandwaste/ConsultationRepresentationsStatement%28Reg22%29Oct2012.pdf>

Policy C3: Minerals and waste development will, wherever possible, take place in areas that are not at risk of flooding. Where development takes place in an area of identified flood risk this should only be where alternative locations in areas of lower flood risk have been explored and discounted (using the Sequential Test and Exceptions Test as necessary) and where a flood risk assessment is able to demonstrate that the risk of flooding is not increased from any source, including:

- *an impediment to the flow of floodwater;*
- *the displacement of floodwater and increased risk of flooding elsewhere;*
- *a reduction in existing floodwater storage capacity;*
- *an adverse effect on the functioning of existing flood defence structures;*
- *the discharge of water into a watercourse.*

The opportunity should be taken to increase flood storage capacity in the flood plain where possible, particularly through the restoration of sand and gravel workings.

7.8 The Environment Agency found the policy acceptable, but individual objections were still made about the need for sequential testing of sand and gravel working and the approach to the restoration of workings in the flood plain. Concern was also expressed about the adequacy of the 2010 SFRA to support a document produced in 2014.

7.9 In OMWLP-CS proposed submission document, August 2015, no change has been made to the policy as included in the February 2014 Draft Plan; but an adjustment has been made to the appendices that identify the level of flood risk associated with minerals and waste development. The SFRA has now been updated (August 2015). National policy is quite clear that sequential testing of options for all development is required, even for development classified as ‘water compatible’: this has been made clear by the Environment Agency in discussion on the plan. The issue of the extent to which waste material may be used to restore mineral working in the floodplain is addressed in policy M10 (Restoration) – see in particular paragraph 4.81 of the supporting text.

Policy C4: Water environment (previously Policy C2)

7.10 Discussion with the Environment Agency on flooding gave rise to consideration of whether a separate policy was required on other aspects of the water environment – in particular water quality and groundwater. A separate policy was drafted and included in the Minerals Planning Strategy and Waste Planning Strategy Consultation Drafts (September 2011).

Policy C2: Minerals and waste development will need to demonstrate that there would be no unacceptable adverse impact on or risk to:

- *The quantity or quality of surface or groundwater resources;*
- *The quantity or quality of water abstraction currently*

experienced by water abstractors unless acceptable alternative provision can be made;

- *The flow of groundwater at or in the vicinity of the site.*

Proposals for minerals and waste development should ensure the protection of watercourses and canals of significant landscape, nature conservation or amenity value.

- 7.11 Supporting text explained that mineral extraction can cause disruption to flows of groundwater through de-watering, and in some cases an impact on groundwater abstractions. Minerals and waste development also has the potential to pollute surface and groundwater resources, and that this may need to be controlled by conditions on planning permissions in some circumstances.
- 7.12 The Environment Agency suggested that the supporting text should make reference to its role in the licensing of groundwater abstractions and to the need for site allocations to avoid areas where development could lead to high risk of groundwater pollution. A separate representation raised concern about impact to adjoining areas from de-watering operations (and the resultant lowering of the water table). The British Waterways Board made comment on the adequacy of the policy to protect the amenity of the Oxford Canal.
- 7.13 The policy was amended and included in the previous Core Strategy Proposed Submission Document (May 2012).

Policy C2: Minerals and waste development will need to demonstrate that there would be no unacceptable adverse impact on or risk to:

- *The quantity or quality of surface or groundwater resources required for habitats, wildlife and human activities;*
- *The quantity or quality of water obtained through abstraction unless acceptable alternative provision can be made;*
- *The flow of groundwater at or in the vicinity of the site.*

Proposals for minerals and waste development should ensure that the River Thames and other watercourses and canals of significant landscape, nature conservation or amenity value are adequately protected.

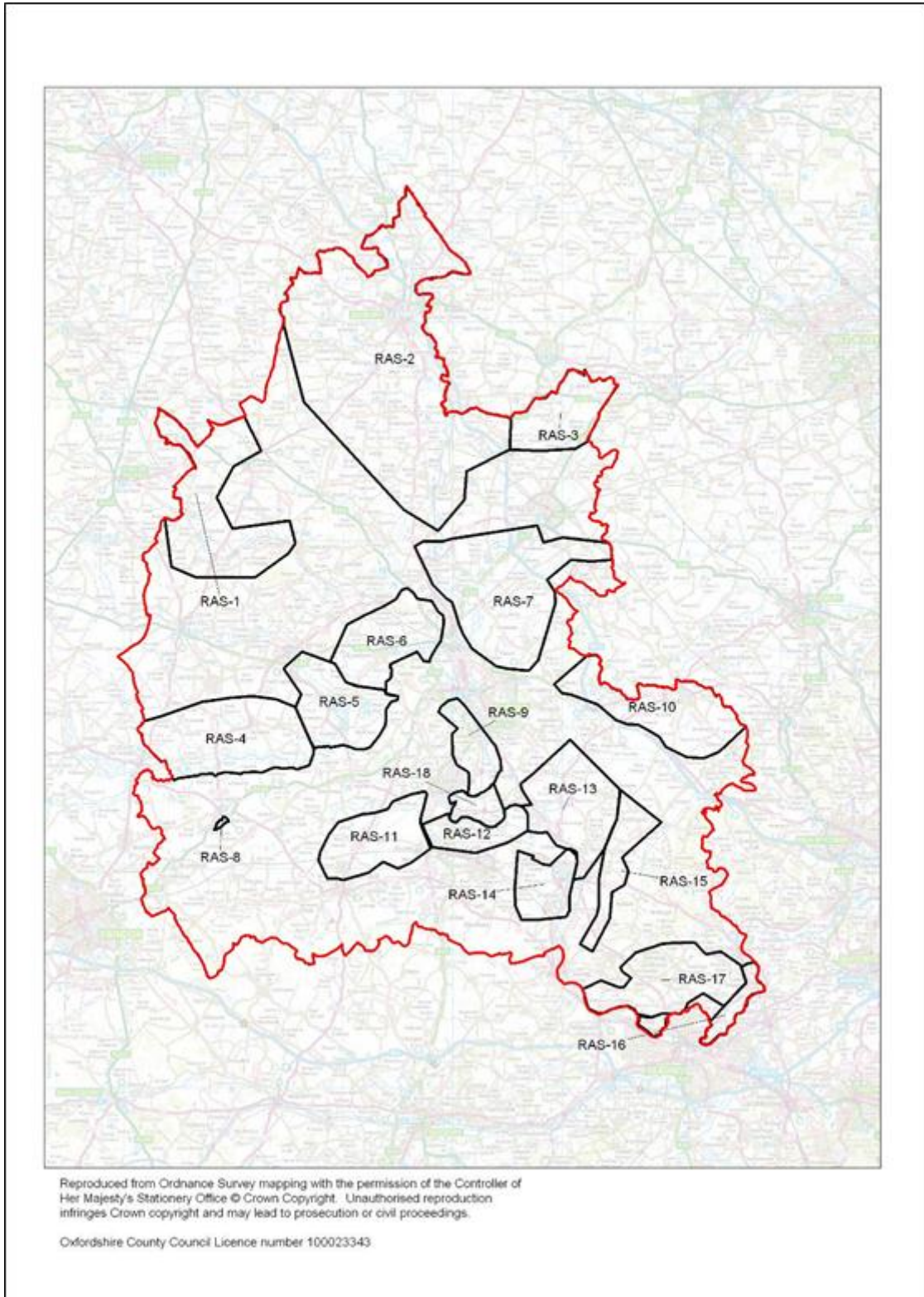
- 7.14 The Supporting Text was expanded to explain the approach likely to be taken by the Environment Agency in its regulation of groundwater impact. Further content was added to address the impact of de-watering and the amenity value of the River Thames, other watercourses and canals.
- 7.15 These amendments appeared to adequately address earlier concerns and responses to the Proposed Submission Document on this subject were positive. A specific concern was raised on the impact of possible mineral development at Cholsey (South Oxfordshire) on the local water table, which was alleged to be very high. This has not been identified

as an issue sufficient to justify precluding the area from being identified as a “Principal Location” for sand and gravel working (policy M3) but this can be addressed further in any site specific proposals.

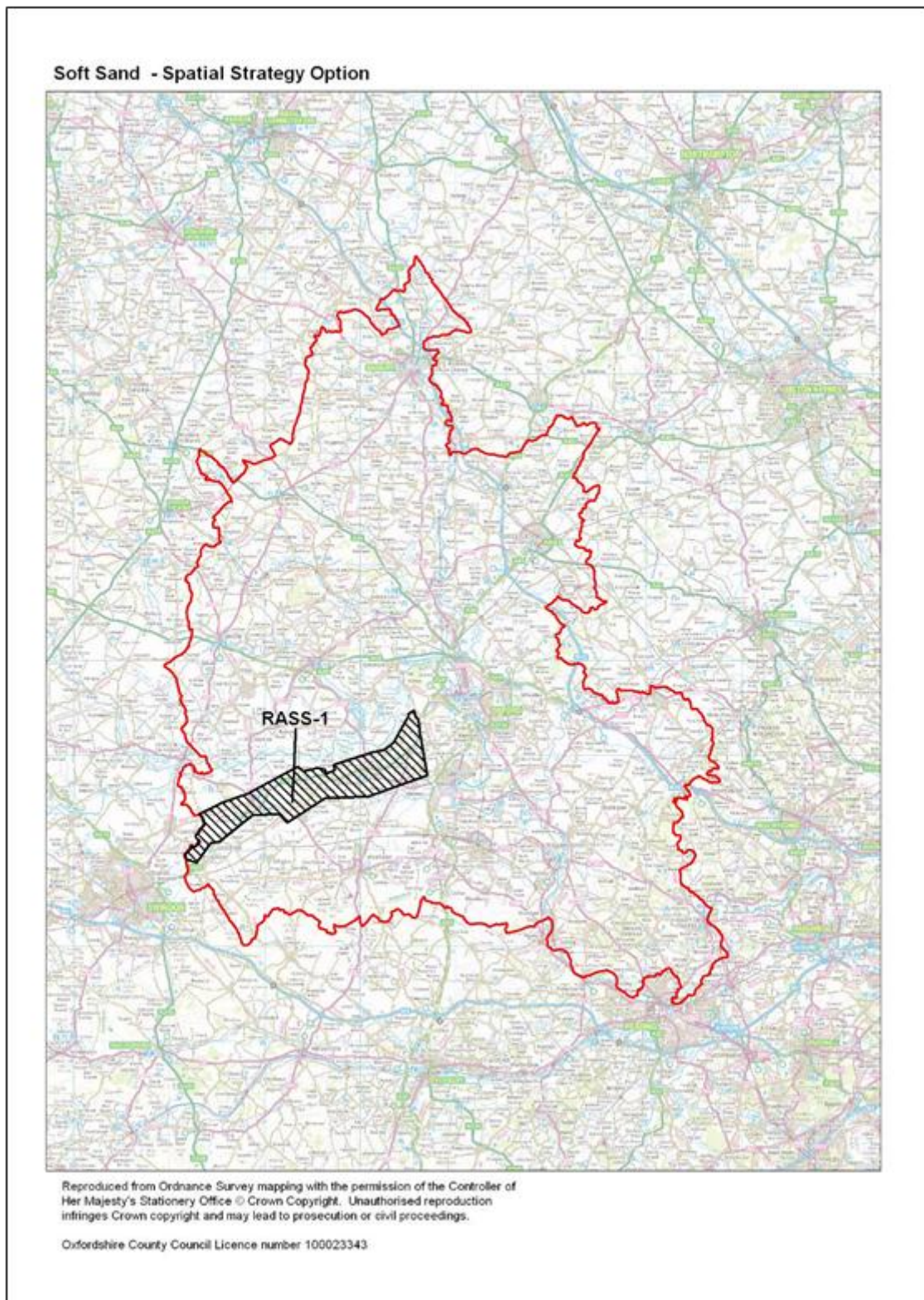
- 7.16 Therefore this policy, renumbered as policy C4, remained unchanged in the consultation draft OMWLP-CS, February 2014; and no further change has been made in OMWLP-CS proposed submission document, August 2015.

Appendix 1

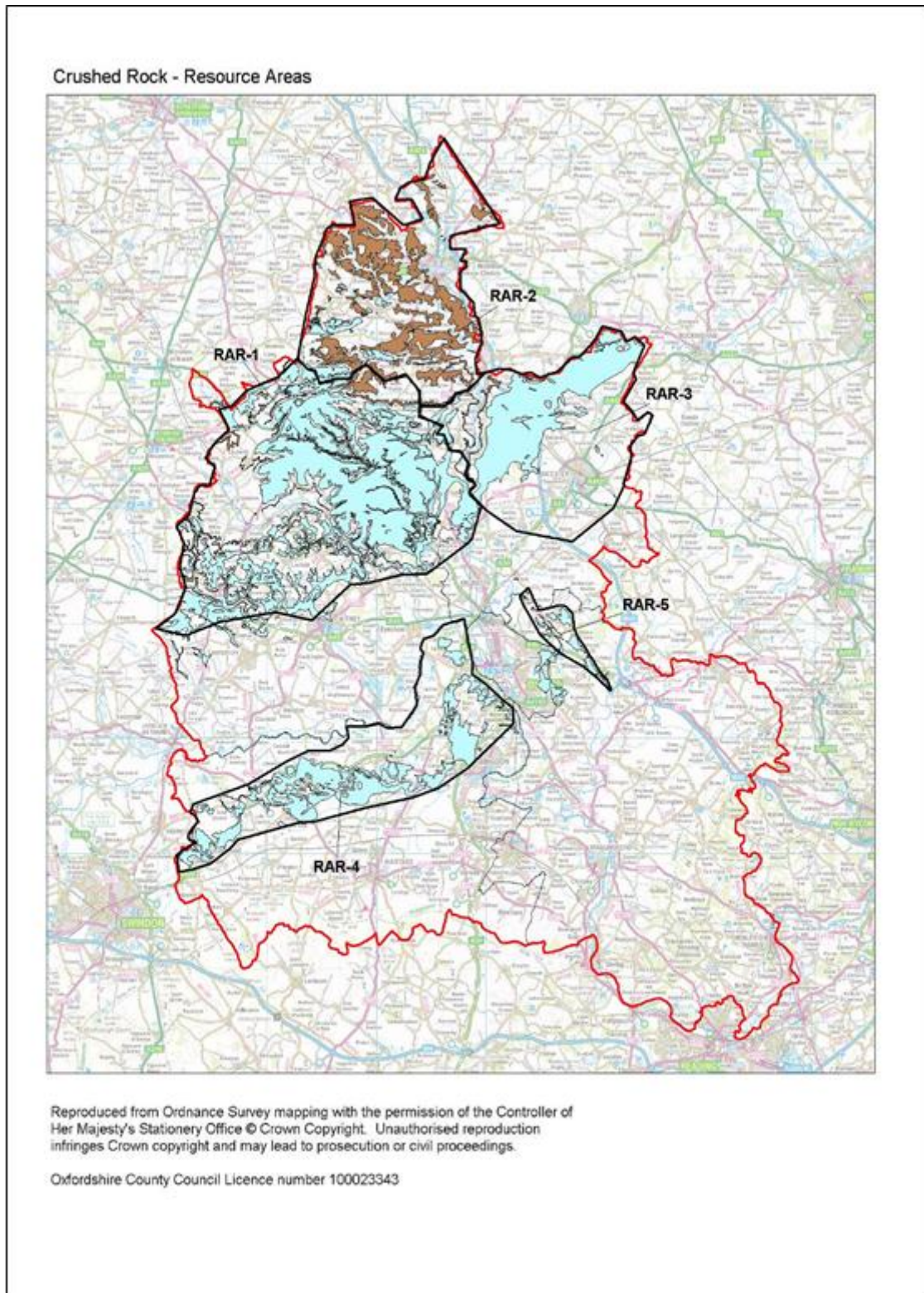
Resource Areas – Sharp Sand and Gravel



Resource Area – Soft Sand



Resource Areas – Crushed Rock



Descriptions of Mineral Resource Area Options

Sharp Sand and Gravel Resource Areas (RAS)

RAS 1

The Upper Evenlode valley is in the Cotswolds AONB. The sand and gravel resources here are thin and intermittent but a great deal of the area lies in flood zone 1. Despite the low flood risk, this area is not considered as a serious strategy option due to its inability to make a strategic contribution to the supply of sand and gravel over the plan period.

RAS 2

The River Cherwell runs from north to south through this resource. It has several tributaries including the Hook Norton, Bloxham and Deddington brooks. A great deal of this area lies in flood zone 1, but the resource area is not considered a serious option because of the thin and intermittent nature of the sand and gravel here.

RAS 3

This area lies in the north east of the county and covers a glacio-fluvial sand and gravel deposit. Again the vast majority of the area lies in flood zone 1 but the area is not included as a serious option because of the thin and localised deposits which are unlikely to be able to make a strategic contribution to the supply of sand and gravel over the plan period.

RAS 4

This extensive area in West Oxfordshire contains some significant resources of sand and gravel. It is bordered to the south by the Upper Thames. Many tributaries flow into the Thames across this resource area, including the Clanfield and Broadwell brooks. Villages such as Bampton have experienced flooding in recent years. The area was initially under consideration but was reduced in size for a second stage 2 consultation¹⁵. It was not developed further, however, on grounds of poor access, infrastructure and distance to markets.

RAS 5

The Lower Windrush Valley lies south of Witney. The river Windrush and the Hardwick Brook flow through this resource area and the Thames follows its southern edge. There has been extensive mineral extraction in the past and the Environment Agency has expressed concerns about the cumulative impact of further working on ground water flows: also on low flows in the River Windrush which were originally caused by water abstraction but which have been exacerbated by gravel extraction and which allows water to percolate

¹⁵ Further clarification provided in the Topic Paper on the Development of the Minerals Spatial Strategy

through intervening margins. There are now large areas of open water with a record of flooding from the Upper Thames, Standlake and New Bridge Cut. Thames Water also has records of sewer flooding in this area. All of these issues fall to be addressed in individual proposals.

But the area still has extensive mineral resources and it has good infrastructure which links it to the A40 and to local markets. For these reasons, the area remains a viable option and now forms the basis for one of the “Principal Locations”. The potential hydrology issues have been balanced against other planning criteria that favour the area continuing to provide for some future extraction. Mitigation measures should be capable of satisfactorily managing the hydrological issues identified.

RAS 6

The Upper Thames flows along the south of this resource area, in the Eynsham/Cassington area. Local villages have been affected by flooding from the River Thames and its tributaries in the past. The area has extensive sand and gravel resources and good access to the A40 and to the main markets in Oxfordshire. Together with RAS 5, it remains the basis for the “Principal Location” for extraction in West Oxfordshire.

RAS 7

The River Cherwell floodplain is dissected by numerous tributaries, including the River Ray which flows from east to west across this resource area. Nearly 70% of the area is in flood zone 1, but the area was excluded as a serious option because of the intermittent nature of the resource and the absence of any interest to work the area by operators.

RAS 8

This small area of sand and gravel lies south west of Faringdon and is almost entirely in flood zone 1. There was initial interest shown in working the small resource but the option was dismissed at an early stage when this interest waned. There are also doubts as to its location relative to the main markets to be served.

RAS 9

This area lies south west of Oxford city centre. The River Thames flows from north to south through it and there are tributaries which cross the area from west to east. The area has been modified since earlier consultation to exclude land at its northern end that would impact on housing if worked. There would also be difficulty accessing this particular section. The southern part of the area (around Radley and Nuneham Courtenay) is nevertheless included as a “Preferred Location” as there has been a history of working and there remains operator interest to demonstrate that this has some potential despite known difficulties over archaeology and environmental impact.

RAS 10

The River Thames runs from east to west and then south through this resource area but much of the area lies in flood zone 1. However, the resource here is thin and intermittent and is unlikely to be able to make a strategic contribution to the supply of sand and gravel over the plan period.

RAS 11

This resource area lies to the south west of Abingdon, where the River Ock and its various tributaries flow east towards the River Thames across the resource. Much of the area lies in flood zone 1 but it has not been developed as a serious option due to its thin and intermittent resource which is unlikely to be able to make a strategic contribution to the supply of sand and gravel over the plan period.

RAS 12

This resource area lies south of the River Thames, between Sutton Courtenay and Long Wittenham. The River Thames runs west to east along the north side of the resource area. There are historic records of flooding along the Upper Thames floodplain. There has been previous working in the Sutton Courtenay area but there are some remaining resources in this area, which has good access to markets and is supported by existing infrastructure. Well over half of the area lies outside the functional floodplain, but much of the deliverable resource lies in the flood plain. Nevertheless there are adequate grounds to justify it forming the basis for a “Preferred Location”.

RAS 13

This is an extensive area in South Oxfordshire where the River Thames flows into the Upper Thames and the Chalgrove Brook passes from east to west to join the River Thames at Stadhampton. Properties at Shillingford and Dorchester have reportedly been affected by fluvial flooding associated with the River Thames and there are records of groundwater flooding along the course of the Ewelme Stream near Benson and Littleworth. Almost 50% of area nominated for extraction is outside the floodplain but the preliminary site assessment indicates evidence of extensive archaeological assets and a lot of grade 1 agricultural land. These are considered to be issues better addressed through detailed site assessment and the area forms the basis for one of the “Preferred Locations” in South Oxfordshire.

RAS 14

This resource area lies between Cholsey and Wallingford. The River Thames flows from north to south along the eastern edge of this area and several brooks cross the resource area, including the Mill Brook and the Cholsey Brook. This area has good access to the Didcot/Wantage /Grove area by virtue of the Wallingford bypass. The majority of the areas identified in site nominations are in Flood Zone 1 and as the area is likely to be able to deliver a reasonable contribution to the overall need it forms the basis for one of the plan’s “Preferred

Locations”.

RAS 15

This area of glacio-fluvial resource lies along the escarpment of the Chiltern hills. Two small streams, the Chalgrove Brook and the Ewelme Stream, cross the resource area the vast majority of which lies in Flood Zone 1. Although some interest has been expressed in working the area has been ruled out as a serious option because the resource is generally thin and intermittent. It also lies within the Chilterns AONB where opportunity for adequate access is likely to be very limited.

RAS 16

This resource area originally comprised two separate areas to the west and an east of Reading and bordering on the north bank of the River Thames. The eastern area adjoins an extensive area of working at Caversham with established infrastructure that offers potential for further working. It is close to the Reading market and is readily accessible so is included as a “Preferred Location” despite the high proportion of deliverable resource in Flood Zone 3. The western area has, however, been excluded as an option due to poor access and the potential impact of working on the Area of Outstanding Natural Beauty. Local villages such as Sonning Eye (in the eastern section) have been affected by flooding from the River Thames and its tributaries in the past and there are some archaeological remains to be considered.

RAS 17

This resource area covers the sand and gravel resources in the Chiltern Hills AONB. 97.6% of this area lies in flood zone 1 but the area has not been included in any of the strategy options because the resource here is thin and intermittent and is unlikely to contribute to the supply of sand and gravel over the plan period.

RAS 18

This area is bounded by the River Thames and has plentiful alluvial sand and gravel resources. Access to the area is, however, constrained by the need to pass through local villages and towns. Despite this and the fact that only a small part of the deliverable area is in Flood Zone 1, the area forms the basis for one of the “Preferred Locations” because of its central location relative to potential markets and the likely quality of the resource. Its location relative to the picturesque River Thames will also need careful consideration in any site specific proposal.

Soft Sand Resource Areas (RASS)

RASS 1

This extensive area of soft sand extends from Oxford south west to Faringdon. A number of streams flow through the resource area and there has been some flooding of properties associated with the Marcham Brook. There are records of sewer flooding near Coleshill and Highworth in the west of the resource area, but the vast majority of the

area lies in Flood Zone 1 and strong operator interest confirms the viability of the resource.

Crushed Rock Resource Areas (RAR)

RAR 1

This resource area covers the limestone resource in the north west of the county, much of which lies in the Cotswolds AONB. The River Evenlode and River Glyme flow east and south respectively to join the Upper Thames just south of the resource area. There are records of properties affected by flooding from the Evenlode and its tributaries at Ascott under Wychwood, Shipton under Wychwood and Charlbury. There are no recorded incidents of groundwater flooding in this area, most of which lies in Flood Zone 1.

Most of the area has been discounted as a serious option because it lies largely within the Cotswolds AONB. However, a small area south of Burford in the extreme south of the resource area (outside the AONB) has been pursued and is now included as a “Preferred Location” partly in view of historic working in the area and continuing operator interest.

This area also includes a small area at Duns Tew that has subsequently been identified as a “Preferred Location” for working soft sand.

RAR 2

This resource area covers the ironstone resource in the north of the county and a small area of limestone. The River Cherwell flows north to south along the eastern edge of the resource area adjacent to the Oxford canal. Several brooks, tributaries of the Cherwell, flow from west to east.

This ironstone resource was not identified as a serious option as there have been extensive permitted ironstone reserves which could have lasted well beyond the end of the plan period.

RAR 3

This resource area covers an extensive limestone resource in the north-east of the county. Despite the extensive area that is shown on the BGS maps, there is only one operational quarry in this area at Ardley. The River Cherwell and Oxford canal are located in the western part of the resource area and flow from north to south. Other brooks flow through Bicester towards the south of the resource area. There has been flooding historically along the floodplain of the River Cherwell, but otherwise a significant part lies in Flood Zone 1.

The northern part of this area has by far the largest potential and forms the basis for the “Preferred Location” to the north west of Bicester.

This area also includes a small area at Duns Tew that has subsequently been identified as a “Preferred Location” for working soft

sand.

RAR 4

This resource area covers the extensive, though intermittent, limestone resource which extends south west from Oxford to Faringdon. The River Ock flows west to east along the south of the resource area. The Upper Thames River flows west to east to the north of the Resource Area and around the eastern end. Properties in several villages were affected by fluvial flooding from the River Ock. Two minor, unnamed tributaries of the River Ock flow south east through the area. Despite this, very little of the area is outside Flood Zone 1.

A small part of the area in the west - around existing quarries at Faringdon – is considered sufficiently important to be identified as a “Preferred Location”.

RAR 5

This small resource area covers an area of intermittent limestone resource north east of Oxford. The upper reaches of the Bayswater Brook are located within the resource area close to Sandhills. The limestone resource here is thin and there are currently no active working quarries. Nearly all of the area lies in Flood Zone 1, but the area has not been included as a “Preferred Location” particularly as there is no evidence of strong demand that needs to be satisfied.

Appendix 5

Sequential Flood Test of Mineral Resource Areas

Sand and Gravel and Soft Sand Resource Areas

Sharp Sand and Gravel Resource Areas									
Option Area	Principal location area	% of the whole area in flood zones			% of deliverable area (nominated sites)			RAG status based on % in FZ 1 & FZ 3	Assessment of the area based on flood risk and other planning criteria
		FZ 1	FZ2 & 3a	FZ 3b	FZ 1	FZ2 & 3a	FZ 3b		
RAS 1	None	93%	1%	6%	No noms	No noms	No noms		Low flood risk area but no nominations.
RAS 2	None	93%	1%	6%	No noms	No noms	No noms		Low flood risk area but no nominations.
RAS 3	None	98%	0%	2%	No noms	No noms	No noms		Low flood risk area but no nominations.
RAS 4	None	57%	7%	36%	61%	6%	32%		Good proportion of workable resource in FZ1 but long distance to markets, poor access / infrastructure + high archaeological interest.
RAS 5	Thames Lower Windrush & Evenlode Valley - Standlake to Yarnton (part)	54%	10%	36%	40%	6%	54%		Good proportion of workable resource in FZ1 with opportunity to work minerals efficiently using existing sites and infrastructure. Good location relative to market. Access and infrastructure good. Relatively low level of constraint, incl. archaeology / designated areas. Detailed assessment of ground water required at planning application stage.

RAS 6	Thames Lower Windrush & Evenlode Valley - Standlake to Yarnton (part)	74%	4%	22%	35%	5%	60%		Good proportion of workable resource in FZ1 with opportunity to work minerals efficiently using existing sites and infrastructure. Good location relative to market. Access and infrastructure good. Relatively low level of constraint, incl. archaeology / designated areas.
RAS 7	None	69%	5%	27%	No noms	No noms	No noms		Low flood risk area but no nominations.
RAS 8	None	100%	0%	0%	No Noms	No noms	No noms		Low flood risk area but no nominations.
RAS 9	Thames & Lower Thames Valley – Kennington to Oxford (part)	71%	7%	21%	27%	9%	64%		Lower level of workable resource in FZ1 relative to overall area but well located relative to market. Care needed over access, archaeological assets & historic environment in site selection.
RAS 10	None	88%	1%	11%	No noms	No noms	No noms		Low flood risk area but no nominations.
RAS 11	None	73%	8%	19%	No noms	No noms	No noms		Low flood risk area but no nominations.
RAS 12	Thames & Lower Thames Valley – Kennington to Oxford (part)	66%	15%	19%	24%	24%	52%		Lower level of workable resource in FZ1 relative to overall area but opportunity to work minerals efficiently using existing sites and infrastructure. Well located relative to market. Access and infrastructure good. Relatively low level of constraint, incl. archaeology /

									designated areas.
RAS 13	Thames & Lower Thames Valley – Kennington to Oxford (part)	77%	8%	15%	46%	30%	24%		Reasonable amount of workable area in FZ1. Well located relative to market. Access/infrastructure good but care needed in site selection - archaeological assets and Grade 1 agricultural land.
RAS 14	Thames & Lower Thames Valley – Kennington to Oxford (part)	81%	7%	12%	82%	9%	9%		Significant part of workable resource in FZ1. Good access and well located relative to markets.
RAS 15	None	98%	0%	2%	100%	0%	0%		Very low flood risk but little operator interest and high level of constraint.
RAS 16	Thames Valley – Caversham to Shiplake	47%	14%	39%	0%	6%	94%		High level of workable resource in areas of high flood risk but opportunity to work minerals efficiently using existing sites and infrastructure. Well located relative to market (Reading and area). Access and infrastructure generally good. Care required over archaeology.
RAS 17	None	97%	1%	2%	No noms	No noms	No noms		Low flood risk area but no nominations.
RAS 18	Thames & Lower Thames Valley – Kennington to Oxford (part)	66%	12%	22%	15%	47%	38%		Lower level of workable resource in FZ1 relative to overall area. Well located relative to market but potential difficulty with access locally.

Soft Sand Resource Areas									
Option Area	Principal location area	% of the whole area in flood zones			% of deliverable area (nominated sites)			RAG status based on % in FZ 1 & FZ 3	Assessment of the area based on flood risk and other planning criteria
		FZ 1	FZ2 & 3a	FZ 3b	FZ 1	FZ2 & 3a	FZ 3b		
RASS 1	Corallian Ridge – Oxford to Faringdon	88%	3%	9%	99%	0%	1%		Nominated resource lies almost completely outside the flood plain.

Key

	Up to 25% deliverable area in FZ 1 and more than 75% deliverable area in FZ 3
	20-50% deliverable area in FZ 1 and 30-75% deliverable area in FZ 3
	More than 50% in FZ 1 and less than 30% in FZ 3

Crushed Rock Resource Areas

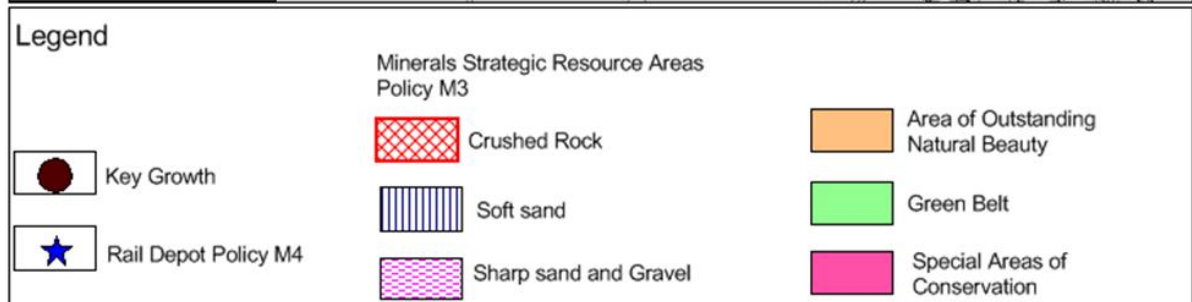
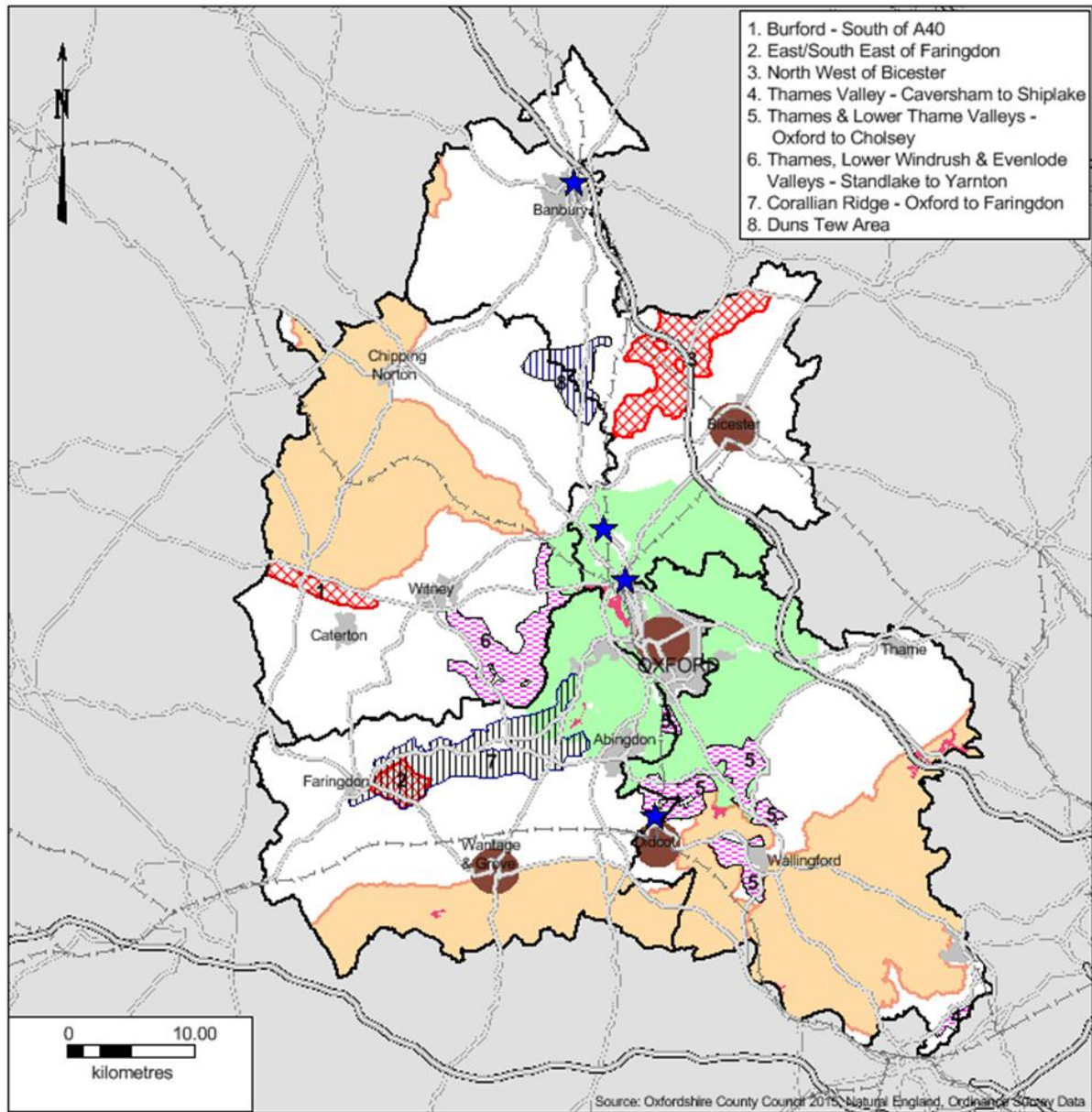
Crushed Rock Resource Areas									
Option Area	Principal location area	% of whole area in the flood zone			% of deliverable area in the flood zone			RAG status based on % in FZ 1 & FZ 3	Comments
		FZ 1	FZ 2 & 3a	FZ 3b	FZ1	FZ 2 & 3a	FZ 3b		
RAR 1	Burford – south of A40	96%	0%	4%	100%	0	0		Low flood risk. Established area of working. Good access, plentiful resource, few environmental constraints.
RAR 2	None	93%	1%	6%	-	-	-		Low flood risk but no nominated resource
RAR 3	North west of Bicester	93%	1%	6%	-	-	-		Low flood risk but no nominations.
RAR 4	East / South East of Faringdon	92%	3%	5%	100	0	0		Low flood risk, established area of working, good access
RAR 5	None	99%	0%	1%	-	-	-		Low flood risk but no nominated resource

Key

	Up to 25% deliverable area in FZ 1 and more than 75% deliverable area in FZ 3
	20-50% deliverable area in FZ 1 and 30-75% deliverable area in FZ 3
	More than 50% in FZ 1 and less than 30% in FZ 3

Appendix 6

“Principal Locations” for Aggregate Mineral Working
 OMWLP-CS Key Diagram (Policy M3)



Appendix 7

Fluvial Flood Risk Assessment of “Principal Locations” for Working Aggregate Minerals

No.	Area	% of the whole area in flood zones			% of deliverable area (nominated sites)			RAG status based on % in FZ 1 & FZ 3 (nominated sites)
		FZ 1	FZ2 & 3a	FZ 3b	FZ 1	FZ2 & 3a	FZ 3b	
Sharp Sand and Gravel								
CS4	Thames Valley – Caversham to Shiplake	2%	6%	92%	0%	4%	96%	
CS5a	Thames & Lower Thame Valleys – Oxford to Cholsey	33%	13%	54%	35%	11%	54%	
CS5b	Thames & Lower Thame Valleys – Oxford to Cholsey	61%	15%	24%	46%	30%	24%	
CS5c	Thames & Lower Thame Valleys – Oxford to Cholsey	49%	30%	21%	0%	3%	97%	
CS5d	Thames & Lower Thame Valleys – Oxford to Cholsey	49%	25%	26%	35%	41%	24%	
CS5e	Thames & Lower Thame Valleys – Oxford to Cholsey	75%	13%	12%	82%	9%	9%	
CS6	Thames, Lower Windrush and Evenlode Valleys	36%	12%	52%	37%	5%	58%	
Soft Sand								
CS7	Corallion Ridge – Oxford to Faringdon	97%	1%	2%	99%	0%	1%	
CS8	Duns Tew area	98%	1%	1%	100%	0%	0%	
Crushed Rock								
CS1	Burford area – South of A40	99%	0%	1%	100%	0%	0%	
CS2	East/South East of Faringdon	99%	0%	1%	99%	0%	1%	
CS3	North West of Bicester	99%	0%	1%	N/A	N/A	N/A	

Key

	Up to 25% deliverable area in FZ 1 and more than 75% deliverable area in FZ 3
	20-50% deliverable area in FZ 1 and 30-75% deliverable area in FZ 3
	More than 50% in FZ 1 and less than 30% in FZ 3