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Authority



Department  
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Food & Rural Affairs

HM Land  
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Ordnance  
Survey



UK Hydrographic  
Office



Valuation Office  
Agency

# GEMINI Recommendations

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For other information on intellectual property rights, see *Annex B: Discussion of Intellectual Property Rights*.

## Version History

Version	Date	Description
0.1	August 2020	GEMINI Recommendations draft report for review.
0.2	October 2020	Taking into account comments on 0.1
1.0	January 2021	Approved version
1.1	March 2021	After s comments from Geospatial Commission

This version of the document has been reviewed by the AGI GEMINI Working Group and deemed feasible. This does not represent a commitment by AGI to implement all of the requested changes.

AGI GEMINI Working Group at this stage included representatives from different organisations with various experience implementing GEMINI:

AGI Council	
Astun Technology	Involved in open source implementation used for Scottish Government and Defra
British Geological Survey	Implementation in house
Centre for Ecology and Hydrology	Use in house
EDINA	Involved in implementation of UK Location Metadata Editor for UK INSPIRE
Marine Environment Data and Information Network	Community profile and implementation
	The original editor of GEMINI

## Project Sponsor

Geospatial Commission	Hugh Phillips Callum Irving
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## Report Authors

Peter Parslow	Ordnance Survey
James Passmore	BGS

Rachel Heaven	BGS
Howard Askew	Ordnance Survey
Shane Adams	Ordnance Survey

**Contributors**

AGI
Defra
Geospatial Commission
HM Land Registry
Met Office
Ordnance Survey
UK Hydrographic Office
Valuation Office Agency
Office of National Statistics
Open Data Institute
Government Digital Service
Environment Agency
Department for Transport

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# 1 Executive summary

## Strategic and Programme context

This work was carried out as part of the Geospatial Commission sponsored Data Improvement Programme which aimed to improve the alignment of public sector geospatial data to the FAIR data principles. As such this work contributes to Mission 2 of the National Geospatial Strategy - Improve access to better location data. This work aimed to improve the findability and accessibility of geospatial data held by the Commission's partner bodies. The objective of this work was to make recommendations for improving the UK GEMINI standard, produced by the AGI and approved by the UK government as the standard for metadata about geographic information resources. It builds on previous work carried out under the Data Improvement Programme that made recommendations to make it easier for people to find the data that they need.

## Background – Metadata Standards how they promote the FAIR-ness of data

Metadata is “*data about data (or a service)*” and is the first thing individuals come across when searching for geospatial data. It helps them find the data and tells them information about the datasets they have found: what it contains, who produced it, who maintains it, and how it can be used. Metadata standards enhance the Findability, Accessibility Interoperability and Reusability (FAIR) of data. They enable the metadata to be widely understood by people and software. Creating metadata records in conformance with a known standard ensures that those records are more consistent, searchable and interoperable, and the data described is more discoverable and accessible to the end-user. This often results in wider sharing and use of data that, in turn, unlocks more value and promotes informed decision-making.

## Previous phases of the programme

In previous phases of the Data Discoverability, Licencing and Linked Identifiers projects, considerable progress was made in cataloguing, describing and linking Geo6 datasets, in addition to promoting increased sharing and re-use through harmonised licences. These projects repeatedly emphasise that the content, format and availability of machine-readable metadata are critical enablers which help users find, understand, access and use data.

The UK GEMINI Standard is endorsed by the Government Digital Service as the appropriate UK metadata standard for describing geospatial data<sup>1</sup>. It is the most appropriate standard which currently exists to satisfy the requirements to make data FAIR. However there is an opportunity to enhance the GEMINI standard and its supporting documentation to improve the FAIR-ness of geospatial data and enable wider implementation of the findings and recommendations from previous projects within the geospatial data ecosystem to unlock more value and promote more informed decision-making.

## UK GEMINI Recommendations Report

This report summarises the activities, approaches and processes undertaken to identify and recommend changes to the GEMINI standard. These recommendations have been proposed to and accepted by the AGI GEMINI Working Group as feasible for inclusion in subsequent releases.

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<sup>1</sup> [Metadata standards for sharing and publishing data - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/metadata-standards-for-sharing-and-publishing-data)

## 2 Introduction

This work was part of the Data Discoverability 3 project which aimed to improve the findability of geospatial data held by the Commission's partner bodies. Another part of the project, the Catalogue Service Specification<sup>2</sup>, investigated other metadata standards and selected GEMINI.

Given that:

- the Government Digital Service has endorsed GEMINI as the appropriate metadata standard for describing geographic data<sup>1</sup>;
- the Geospatial Commission continues to endorse data.gov.uk as the relevant national portal for geographic data; and
- data.gov.uk and the Scottish SDI accept GEMINI records,

it seems appropriate to enhance GEMINI in order to more widely allow implementation of the previous recommendations from those previous projects. This report sets out those recommended enhancements.

## Project activities

Several prior Geospatial Commission Data Improvement Programme projects are the origin of the recommendations described in this report.

The first activity conducted for this report was to extract findings, recommendations and insights from all of those Data Improvement Programme projects that might be relevant to GEMINI and that could possibly result in changes to the standard.

The second activity consisted of an analysis of the recommendations identified in the first activity and was carried out by a panel of geospatial metadata experts. The objective of this work was to produce a comprehensive set of detailed recommendations of how GEMINI 2.3 could be used or enhanced. The next section of this report discusses this activity.

Section [3](#) of this document describes the set of recommendations that AGI is asked to consider implementing. The Geospatial Commission may issue additional guidance if any other recommendations are not implemented in GEMINI.

The output of these activities was then widely reviewed, receiving comments from the organisations listed above as contributors. As a result, we made a number of changes. We also added one or two minor things, which are indicated as arising from review, rather than from previous projects.

## Key Findings from previous projects

The recommendations suggested in previous Data Improvement Programme projects were analysed to come up with the final list of GEMINI recommendations.

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<sup>2</sup> See DD3-6 *Selecting standard specifications for Geo6 metadata records and catalogue services*

## Data Discoverability Projects 1 and 2

- search engines, in particular Google, are the primary tool used to find geospatial data;
- as more data is published on the web, it becomes increasingly difficult for users to find what they are looking for; and
- the data itself is often not readable by search engines, which must instead rely on the available discovery metadata.

These findings were based on a mixture of studying previous work in UK and Europe, and original user research, observing a range of users with a range of experience as they attempted to find the data to complete some tasks. Some of these findings are published in the Geospatial Commission's [Search engine optimisation \(SEO\) for data publishers: Best practice guide](#).

## Licensing Projects

- licensing restrictions and terminology are constantly identified as a barrier to accessing the required data; and
- licences should be machine- and human-readable, support their paper equivalents and be searchable.

## Linked Identifiers Projects

- the true value of a dataset increases significantly when linkages between the unique identifiers of multiple datasets are created both within, and across organisations;
- a dataset's unique identifiers should be effectively managed, maintained and published; and
- life cycle metadata is an important mechanism to understand and manage changes within a dataset over time.

These findings repeatedly emphasise that the content, format and availability of machine-readable metadata are critical enablers which help users find, understand, access and use geospatial data for maximum effect.

## Additional recommendations arising from peer review

GEMINI supports interoperability, which is a key part of the UK National Data Strategy and Geospatial Strategy. It should make more of this by briefly describing how it does this, in one of the introductory pages. See [DD3 R1](#).

In many cases it is beneficial to provide a more precise spatial extent, rather than simply a bounding box. See [DD3 R14b](#).

## DD3 GEMINI recommendations

The following recommendations were produced based on recommendations from previous research and peer engagement:

DD3 R1 Introduce GEMINI in the context of wider principles
DD3 R2. Include discussion of the lifecycle management of the dataset and metadata
DD3 R2a Allow use of ISO 19115-1:2014's extended CI_DateTypeCodeodelist on Dataset reference date
DD3 R3. Include a discussion of the life cycle of the metadata
DD3 R4. Include general section on language to use
DD3 R5. General section on 'linking out to things'
DD3 R6. Discuss how to describe information about licences/licensing <ul style="list-style-type: none"> <li>DD3 R6a. Resolve current ambiguity about where to describe licences</li> <li>DD3 R6b. Strengthen the recommendation regarding linking to a licence</li> <li>DD3 R6c. Include mention of machine-readable licences</li> </ul>
DD3 R7. Where possible, add Schema.org "corresponding element" entries to GEMINI elements
DD3 R8. Provide encoding guidance on embedding Schema.org in HTML with JSON-LD
DD3 R9. Add a GEMINI element identical to ISO 19115 MD_Identification.purpose
DD3 R10. Add a GEMINI element equivalent to ISO 19115 MD_Identification.resourceSpecificUsage
DD3 R11. Add GEMINI element equivalent to MD_Identification.status
DD3 R12. Proposed additional sub-element of Keyword called 'Keyword type'
DD3 R13. Add a GEMINI sub-element equivalent to LI_Lineage source
DD3 R14 Improve the per-element guidance in a number of ways <ul style="list-style-type: none"> <li>DD3 R14a Improve guidance on designing identifiers</li> <li>DD3 R14b More precise spatial extents can be provided</li> </ul>

## UK GEMINI Standard

The Data Discoverability projects recognise and recommend the UK GEMINI Standard as the most appropriate standard which currently exists to satisfy these requirements. However, they recognise that additional improvements could be made to both the standard and its supporting documentation which would further improve the Findability, Accessibility, Interoperability and Re-usability of geospatial data. This would improve the overall user journey and experience when finding and accessing geospatial data. This will subsequently lead to wider and better use of geospatial data, in turn unlocking its true value for both the immediate user, and society more widely. In the flow of text, this document follows the practice of GEMINI itself, by shortening "UK GEMINI Standard" to GEMINI.



GEMINI is the UK standard for geospatial metadata. Owned by the Association for Geographic Information (AGI) it builds on the ISO 19115 standard for metadata about geographic information, in a way that ensures compliance with the INSPIRE technical guidelines<sup>3</sup>. The INSPIRE Regulations 2009 require public authorities to make available under harmonised conditions spatial data falling under one of 34 data themes which were set out in the INSPIRE Directive, and to operate spatial data services so the data can be easily accessed for use and re-use. Using GEMINI for metadata allows organisations to fulfil part of their obligations.

Data Discoverability 2 made no recommendation that the UK should move away from using AGI's GEMINI standard as the way to describe geographic data. This has been confirmed by the Data Discoverability 3 DD3-5 Catalogue Service Specification activity. For more detail refer to the DD3-5 report.

For ease of recognition, phrases in italics are the titles of GEMINI elements or the titles of cited documents.

**Navigation tip:** there are several links between sections within this document. The shortcut to return to your original position is *Alt and left arrow*, **Alt ←**

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<sup>3</sup> As documented in *Technical Guidance for the implementation of INSPIRE dataset and service metadata based on ISO/TS 19139:2007*, <http://inspire.ec.europa.eu/id/document/tg/metadata-iso19139/2.0>, hereafter referred to as "INSPIRE Metadata TG"

## 3 Analysis of Recommendations

The aim of this activity is to make clear recommendations as to how GEMINI 2.3 could be used or enhanced to implement the findings of this and earlier Geospatial Commission data improvement projects. In this section, the recommendations of previous projects retain the original numbering for ease of reference and are presented in the order of the original project recommendations. Recommendations number DD3 Rx are the recommendations of this project.

### 3.1 Methodology

We approached the analysis with the understanding that the impact on GEMINI 2.3 and software which already implements it, would be as little as possible when implementing the recommendations in this report. We therefore defined a set of options for taking action which ranges from least intrusive (option 1) to most intrusive (option 8). The options are tabled below:

Option	Description	Likely change to software implementation	compliance with INSPIRE Metadata TG	ISO 19115:2003 compliance
1	Only change informative aspects of GEMINI	Minor or none	Yes	Yes
2	Minor change to normative aspect of existing GEMINI element (definition, purpose, meaning) within INSPIRE	Minor or none	Yes	Yes
3	Larger change to normative aspect (e.g. obligation, domain), within INSPIRE	Minor	Yes	Yes
4	Additional element that exists in relevant ISO standard	Major	Yes	Yes
5	Change that breaks compatibility with INSPIRE	Probably major	No	Yes
6	Change that goes outside ISO 19115:2003	Major	No	No
7	Change that uses ISO 19115-1:2018	Major	No	No
8	Move away from GEMINI, or GEMINI away from ISO 19115	Major	No	No

#### Further considerations

##### *Additional encodings*

For some recommendations, it may be appropriate to recommend that GEMINI adds an additional encoding to improve web search discovery. There is published work on DCAT and Schema.org encodings/crosswalks of subsets of ISO 19115, which has helped in determining a DCAT2 encoding, as has the European Commission publication *GeoDCAT Application Profile*<sup>4</sup>.

<sup>4</sup> <https://joinup.ec.europa.eu/collection/semantic-interoperability-community-semic/solution/geodcat-application-profile-data-portals-europe>

### Controlled lists

ISO 19115 recognises two types of controlled list:

1. *Enumerations*: closed lists that are enforced in the XML schema. These cannot be extended, but sometimes GEMINI only recommends a subset of the list. Example: Topic Category.
2. *Code lists*: these are extensible. Initial sets of values have been provided by TC211. It is possible to publish additional values, but it is bad practice to use a value without it being published on the web. Any recommendations to extend code lists should be supported with a web (URL) reference to a published value.

INSPIRE divides the code list concept further:

- a. Code lists that are managed in a common code list register and that shall not be extended by Member States; “not extensible”.
- b. Code lists that may be extended by Member States. “extensible”.

INSPIRE also recognises code lists that are managed externally. GEMINI already recommends some existing code lists, e.g. ISO 639 (INSPIRE specifies a subset of these language codes), and from NERC.

## 3.2 Findings

These are the recommendations drawn from Data Improvement Programme projects which could be implemented through changes to GEMINI 2.3. GEMINI elements are identified by their names in *italic text*.

### 3.2.1 Data Discoverability 2

#### **DD2 R1. Embed Schema.org in HTML using JSON-LD**

Where relevant, add “corresponding element in Schema.org” entries from [https://www.w3.org/2015/spatial/wiki/ISO\\_19115\\_-\\_DCAT\\_-\\_Schema.org\\_mapping](https://www.w3.org/2015/spatial/wiki/ISO_19115_-_DCAT_-_Schema.org_mapping)

See [DD3 R7](#).

#### **DD2 R4. Apply SEO techniques to page content**

This applies to all textual information in a GEMINI record that may appear in a web page, but especially to the *Title*, *Abstract*, *Lineage*, and licence information.

See [DD3 R4](#).

DD2 R4 includes the suggestion: “allow publishers to edit the topic field on (data.gov.uk) metadata records”.

Rather than manually editing the “topic” field, data.gov.uk could populate its “topic” field from the GEMINI record. Rather than GEMINI *Topic* (which has a short ISO controlled list), it would be preferable to set it from a GEMINI *Keyword*. This keyword could be indicated with the ISO keyword type “theme”.

See [DD3 R12](#).

**DD2 R5. Apply SEO techniques to page URLs**

This is not always in the control of the creator of a GEMINI. It concerns the web publication of GEMINI records, which may be done in a variety of aggregating portals. Such publication should be encouraged to follow this recommendation, but it is unlikely that an aggregating portal can apply the same rule to get a good SEO result for every incoming GEMINI record.

We have not made a recommendation to change GEMINI for this.

**DD2 R6. Improve the governance around published metadata**

This could be supported by a mixture of a new GEMINI element 'Metadata status', and possible guidance on use of *Maintenance information*.

See [DD3 R2](#) and [DD3 R3](#).

**Recommendations that affect *Title*, *Keywords*, *Abstract*****DD2 R7. Understand how your users search for your data****DD2 R8. Level of granularity should reflect real world concepts****DD2 R9. Level of granularity should reflect chunky middle terms**

These three should influence the choice of *Title*, *Keywords*, and wording of the *Abstract*. Ideally, they influence the design decisions of the dataset.

See [DD3 R4](#).

**DD2 R10. Metadata titles should include the real-world, chunky middle concept to reflect acceptable level of granularity**

Chunky middle terms target relevant and refined keywords that attract the greatest number of people with the correct intent whilst minimising the effort required to attain a top position on a search engine result page.

Minor update to the guidance for GEMINI element *Title*.

See [DD3 R4](#).

**DD2 R11. Metadata title and content should be written in plain English**

Consider changes to the general guidance in the [Metadata Guidelines for Geospatial Data Resources – Part 2](#), for example section 3.4 that include statements like "Documentation is too generalised".

GEMINI element *Title* already gives this guidance:

- the name should be readily recognisable;
- the title should be the formal or product name for the data resource, if existing; and
- if no name exists, then a title should be created that is short, encapsulates the subject, temporal and spatial coverage of the data resource, and does not contain terms or jargon that make it incomprehensible.

GEMINI element *Abstract* already gives this guidance:

- aim to be understood by non-experts;
- do not include general background information; and
- avoid jargon and unexplained abbreviations.

Consider adding an explicit mention of plain English.

See [DD3 R4](#).

**DD2 R12. Metadata should either not include acronyms or acronyms should ALWAYS be expanded**

**DD2 R13. Do not assume any domain knowledge**

Already covered by, e.g. *Abstract* guidance item 10. This could be extended with some text from the full recommendation.

See [DD3 R4](#).

**DD2 R30. Report assessment results on data.gov.uk**

DD2 provided an Authoritative Data Assessment tool<sup>5</sup> and recommended that the results of using the tool should be displayed to users.

In this tool “data publishers are first asked to clearly state an intended purpose, against which the quality of a geospatial dataset is measured”.

See [DD3 R10](#).

It should be possible to either include the Authoritative Data Assessment result in the GEMINI record, or reference it if it is published in full on the web somewhere.

**DD2 R30a. Search results**

“Given the importance of purpose or use, which has been repeatedly recognised through this work, it is recommended that data publishers ensure a clear, concise purpose statement is included within the abstract, in order to include this important additional context.”

However, ISO 19115 includes a specific element to hold the ‘purpose’. This should be encouraged in GEMINI, so long as the value of the element is also made available in any human readable web-indexed display of the GEMINI record.

Recommend adding ISO MD\_Identification>purpose (idpurp) and MD\_Identification>resourceSpecificUsage elements to GEMINI.

See [DD3 R9](#) and [DD3 R10](#).

**DD2 R34 Create a list of geospatial use cases**

See [DD3 R9](#) and [DD3 R10](#).

“Throughout the development of the Assessment Process, use case and purpose has been constantly recognised as an important factor when identifying and assessing authoritative datasets. This was also raised by the Peer Review Panel and has led to the initial (indicative) inclusion of Ordnance Survey’s ‘super use cases’ and more detailed guidance on constructing a purpose statement.

It is recommended that future work considers and defines a shortlist of no more than 20 key uses of geospatial datasets. This could build on:

- Ordnance Survey’s ‘super use cases’ (included in the Assessment Process);
- purpose statements listed in Annex 19<sup>6</sup>; and

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<sup>5</sup> <https://www.gov.uk/government/publications/assess-relevance-of-geospatial-data>

<sup>6</sup> Annex 19 of the DD2 report.

- the use cases described in the Open Data Institute's guide, [Using Geospatial Data: A guide to Licencing](#).

It is expected that this list of use cases would be presented at a similar level of detail as that of the Open Data Institute's guide on [Using Geospatial Data: A Guide to Licencing](#) and should be relevant to all geospatial data, not just Geo6 data. The similarities and differences between geospatial datasets should be identified to help users understand which ones are better for which purposes, particularly where their specific use case is not listed. A series of user journeys and personas should be identified to help new users understand the things they need to consider when looking for and comparing geospatial datasets."

Such a list of geospatial use cases could be referenced from the ISO 19115 element "purpose" and also "resourceSpecificUsage", reflecting the original intended purpose and other purposes to which the data has been put.

The DD2 report "Authoritative Data" section highlights the role of the perceived value of the data in a user's decision. Knowing what other users have used the dataset for, can contribute to this.

### **DD2 R37. Create and maintain data sharing metadata – Integrate DSA process**

DD2 provided a Data Sharing Assessment tool<sup>7</sup> and recommended that the results of using the tool should be displayed to users

The idea here is to publish the result of the data sharing assessment, particularly in cases where, as a result of using the tool, the data is not available to the public. Some results may also help explain why the data is available but has licence constraints.

Many of the results map approximately to the INSPIRE reasons for limiting public access to data and would therefore be published as a *Limitations on public access*. The DSA tool is being amended to make this easier.

No change required to GEMINI. The DSA tool and associated instructions will make it clear how to put the result into a GEMINI record.

## **3.2.2 Linked Identifiers**

### **LI BPG7**

Add GEMINI element (resource) Status, using ISO 19115:2003 'status'.

See [DD3 R11](#).

### **LI BPG32**

Consider including ISO 19115:2003.

MD\_Metadata.contentInfo.MDFeatureCatalogueDescription.featureTypes, but we consider that *Keyword* is sufficient.

## **3.2.3 Licensing**

Some of the licensing recommendations can be summarised as "datasets should be organised so that open data is not mixed with data under other conditions in the same dataset." – add this (somewhere) to the

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<sup>7</sup> <https://www.gov.uk/government/publications/access-to-geospatial-data>

GEMINI guidance. Like all the projects discussed here, this is in the context of metadata (and licences) for published datasets, not for datasets undergoing processing within an organisation.

**LIC R5. The digital licensing standard should allow licences to be read by a machine and a human, and structured, using existing mechanisms where appropriate, to link to and describe licensing information allowing key terms to be searchable by both.**

Specifically, the GEMINI wording could be updated here to mention that a licence could be machine-readable or simply 'for humans'. The way that GEMINI references the licence(s) would not differ.

See [DD3 R6c](#).

The GEMINI guidance currently says that if the metadata includes multiple licences then the *Use constraints* URL should point to a data provider page. This makes machine readability harder. For example, it would prevent an application searching for datasets offered with an open data licence.

However, ISO 19115:2003 offers no insight into how to interpret a metadata record that describes multiple licences: are they choices? do they apply to different parts of the dataset? do they all apply? The first two of these are real life use cases across the Geo6.

There are four use cases, three of which we know occur:

1. a simple case of one dataset having one licence. No problem. Not discussed further;
2. a dataset where different licences apply to different parts of it. This is apparently not an uncommon situation within BGS, MEDIN, and the Environment Agency. We believe it applies in situations where there is an existing overarching data sharing agreement that provides the trust framework that the recipient will honour the licence conditions, e.g. not share the confidential bits inappropriately;
3. a dataset that is available with a choice of licences (e.g. DEL, public sector, commercial). This is common for OS and probably others (at least DEL and another); and
4. a dataset that has several licences applying simultaneously to the whole dataset. This is the one where we have no actual evidence of it ever occurring.

DCAT allows for Case 3 because each dataset has one or more distributions, and it is the distribution that carries the licence. This seems akin to what we found last year as “offerings” – a dataset can be offered with different licences. Sadly, ISO 19115 (and Schema.org) don't allow this – so the semantics of having more than one licence associated with a dataset is undefined.

Therefore, we recommend that:

For Case 2: either:

- split up (redact!) the dataset, so that it is distributed as two or more different datasets, each with one licence.
- Link to a web page that explains the situation\*.

For Case 3: either:

- make a separate GEMINI record for each 'offering'.
- link to a web page that explains the situation\*.

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\* In all cases, this is less amenable to machine discovery/filtering a search by licence.

For Case 4: either:

- create a new licence that includes all the other licences.
- link to a web page that explains the situation\*.

It is true that this will make some currently “valid” GEMINI records invalid, where they link to more than one licence. Given that ISO 19115 does not define any meaning for multiple occurrences, such records are currently ambiguous: do all the licences apply? Do they represent choices? Do some apply to some parts and some to others? Such records may be ‘schema valid’, but they do not satisfy the requirement of allowing the user to understand what the conditions are – and they do not follow the current GEMINI Guidance “If more than one type of licence is included then the URL should point to a Data Providers page.”

So, the guidance and validation should be updated to explain how multiple licences could be handled.

See [DD3 R6b](#).

Also, recommend all licence information to live in *Use constraints*, with *Limitation on public access* focussing on reasons why the data is not publicly accessible (which may include “IPR” i.e. the constraints imposed on the data publisher by licences that they have with data providers).

See [DD3 R6a](#).

**LIC R6. The machine-readable licence should support the paper equivalent.**

On further study, this does not impact the way that GEMINI allows a dataset to link to the licence.

No DD3 recommendation.

**LIC R7. Ensure the standard has a workable solution for acknowledging the data owner, with the ability to pass this provenance through to derived outputs.**

Add new GEMINI elements “Source” to allow the metadata of the derived dataset to explicitly reference the source dataset. This may also imply that a Responsible party with role “owner” is important.

If a dataset that is likely to be used as a source has a specific way in which it should be cited, make it clear where to state that. At present, GEMINI encoding guidance for *Alternative title* rather hides the suggestion that ISO 19115 “otherCitationDetails may be used to record a formal DOI [Digital Object Identifier] citation string”. But perhaps *Resource identifier* is a more appropriate place?

See [DD3 R13](#).

**Roadmap Phase 1 Activity 3 Provide a demonstrator for searching and discoverability of machine-readable licence terms, based on the proof of concept licences.**

This could be supported by the suggestion at LIC R5 above.



## 4 GEMINI Recommendations

This section sorts the findings of the *Analysis of recommendations* section into the order of the GEMINI elements, in order to provide a clear picture to the AGI GEMINI Working Group of the suggested changes.

This is a list of the recommendations that are elaborated below; each is a link within this document.

[DD3 R1 Introduce GEMINI in the context of wider principles](#)

[DD3 R2. Include discussion of the lifecycle management of the dataset and metadata](#)

[DD3 R2a Allow use of ISO 19115-1:2014's extended CI DateTypeCode codelist on Dataset reference date](#)

[DD3 R3. Include a discussion of the life cycle of the metadata](#)

[DD3 R4. Include general section on language to use](#)

[DD3 R5. General section on 'linking out to things'](#)

[DD3 R6. Discuss how to describe information about licences/licensing](#)

- [DD3 R6a. Resolve current ambiguity about where to describe licences](#)
- [DD3 R6b. Strengthen the recommendation regarding linking to a licence](#)
- [DD3 R6c. Include mention of machine-readable licences](#)

[DD3 R7. Where possible, add Schema.org "corresponding element" entries to GEMINI elements](#)

[DD3 R8. Provide encoding guidance on embedding Schema.org in HTML with JSON-LD](#)

[DD3 R9. Add a GEMINI element identical to ISO 19115 MD Identification.purpose](#)

[DD3 R10. Add a GEMINI element equivalent to ISO 19115 MD Identification.resourceSpecificUsage](#)

[DD3 R11. Add GEMINI element equivalent to MD Identification.status](#)

[DD3 R12. Proposed additional sub-element of Keyword called 'Keyword type'](#)

[DD3 R13. Add a GEMINI sub-element equivalent to LI Lineage source](#)

[DD3 R14 Improve the per-element guidance in a number of ways](#)

- [DD3 R14a Improve guidance on designing identifiers](#)
- [DD3 R14b More precise spatial extents can be provided](#)

### 4.1 GEMINI general guidance

These recommendations apply to GEMINI 2.3 at [Metadata Guidelines for Geospatial Data Resources](#).

#### **DD3 R1 Introduce GEMINI in the context of wider principles**

This recommendation arose from Peer Review comments while drafting this document. That is, some of the peer review organisations feel that GEMINI should promote itself more, in the context of things like the UK National Data Strategy.

GEMINI supports several aspects of good data management, such as making it easier to find and access the data. At the moment, these are framed in the National Data Strategy and Location Data Strategy. The GEMINI introductory pages should make more of this relationship in order to make it clearer how an organisation can benefit from adopting GEMINI.

It would also be useful to link to the UK government guidance that recommends public authorities to use GEMINI, and to provide links to related resources such as GEMINI software implementations.

**DD3 R2. Include discussion of the lifecycle management of the dataset and metadata**

From [DD2 R6](#).

Like all the recommendations discussed here, this is in the context of metadata for published datasets, not for datasets undergoing processing within an organisation.

Encourage data producers to consider the metadata at the same time that they are designing the data product. They should consider:

- what term might users search for that could form part of the dataset Title? This in turn may influence how a larger set of data could be partitioned thematically so that users more easily find the data they are looking for;
- in what way will they partition the data: a series with datasets, or a dataset with tiles, etc.; and
- that they need to avoid mixing in the same dataset data that is only available under one set of (licensing) conditions with data that is available under another set of conditions.
- Under what conditions does the status of the data change? What will trigger a new release of the data (with an updated *Dataset reference date*)? What should then happen to the old “version” of the data, and does this mean a new metadata record – for the new version, or the old one?
- What is the relationship for this dataset between *Temporal extent*, *Dataset reference date* and *Maintenance information*?

Some of these decisions might only affect the data and metadata managed internally within the data publisher (or aggregator). Other organisations may make all intermediate stages available to the public (“publish them”).

See <https://www.agi.org.uk/agi-groups/standards-committee/uk-gemini/40-gemini/1051-uk-gemini-v2-2-specification-for-discovery-metadata-for-geospatial-resources#4.1> where this information could perhaps reside.

Also, where the licence under which the resource is available changes, it may sometimes be best to issue a new metadata record. This is a decision for the publishing organisation. That implies that a change of licence which is known in advance, for example the end of an embargo period, requires clearer guidance – effectively a discussion of the lifecycle of the metadata record.

- **DD3 R2a Allow use of ISO 19115-1:2014’s extended CI\_DateTypeCode codelist on Dataset reference date**

Consider using the ISO 19115-1:2014 extended CI\_DateTypeCode codelist on Dataset reference date, which includes many more useful ones e.g. expiry, deprecated, superseded, validityExpires. There is a clear relationship with the ISO 19115 element *status* which we are recommending be added to GEMINI. This overlap could be monitored, for example, a GEMINI record which includes a Dataset reference date with CI\_DateTypeCode of “superseded” should have status=superseded as well.

Note: ISO 19115-1:2014 has associated resource with association type “revisionOf”.

**DD3 R3. Include a discussion of the life cycle of the metadata**

From [DD2 R6](#).

This includes deciding what is the canonical (master) version of the metadata, and how the metadata publisher considers copies and other representations that are likely to be made, for example on aggregating services and portals, or by restyling to HTML.

See “canonical” discussion in *Provide encoding guidance on embedding Schema.org in HTML using JSON-LD* above.

The GEMINI guidance should state that it is valid to describe a deprecated dataset and describe how to do this. In ISO 19115, this is best supported by MD\_Identification.status – see recommendation to add this element.

It's not clear whether this general discussion should go in [UK GEMINI standard and INSPIRE implementing rules](#), [Metadata Guidelines for Geospatial Data Resources - Part 1](#), [Part 2](#), or even in [Part 3](#) of the guidance. The subject is touched on at 2.3 in Part 1 *Metadata as a business process* and expanded in Part 3.

#### **DD3 R4. Include general section on language to use**

From [DD2 R4](#), [DD2 R7](#), [DD2 R8](#), [DD2 R9](#), [DD2 R12](#), [DD2 R13](#).

Explicitly encourage the use of plain language, referencing for example the UK government writing guidance at <https://www.gov.uk/guidance/content-design/writing-for-gov-uk> and the “[Accessibility and assisted digital](#)” section of government service manual, in particular their discussion of [WCAG 2.1 design principle 3 Understandable](#).

Encourage use of terms that users search for, especially in elements *Title*, *Keyword* and *Abstract*. This may also apply to *Lineage* and licence information.

For *Extent*, this means using terms that different user communities use for places; this may include both formal place names from controlled lists such as counties, constituencies, or statistical units, and informal names. The metadata creator should be careful to use a name which is a close match for the area being described.

#### **DD3 R5. General section on ‘linking out to things’**

This arose from peer review comments, where different organisations encouraged links to additional documents, other related datasets, terms in glossaries, and the results of data sharing risk assessments, licences.

See also the Linked Identifiers Project described in section 3.2.2.

Note: this is not intended to be a discussion of *Resource locators*, but in the context of ‘controlled lists of terms’.

At present, the XML Encoding pages describe how to do this. It would be helpful if the general guidance indicated where it is most useful and the reasons for it. That can then explain the conceptual difference between linking out to a pre-defined ISO 19115 (19139) fragment, and linking out to a character string. It may still be appropriate that the difference in validation of these two is described in the XML Encoding pages.

From our thinking, the prime candidates are *Keyword*, *Extent*, licences and *Conformity* (where it is already the case).

At present, general guidance is spread across the GEMINI introductory web page and the two pages that originated from Part 1 and Part 2 of the GEMINI Guidance. These should probably be consolidated, and this text added in an appropriate place:

Where possible, use references to authoritative external definitions rather than simply free text. For example:

- where a keyword or geographic extent (named place) is available online, include a link to it;
- link to the specifications which you cite in conformity clauses; and
- link to online licences where available.

Section 2.2.11 of the Encoding Guidance should be changed as it currently says that: “Typically, *by reference* shall be used for identifying the vertical CRS of a vertical extent and the implementation of coupled resource (following INSPIRE guidelines) alone”, whereas GEMINI actually encourages the use of links out to controlled lists and other reference data in a wider range of GEMINI elements.

### **DD3 R6. Discuss how to describe information about licences/licensing**

See discussion under Licencing Project at 3.2.3

- **DD3 R6a. Resolve current ambiguity about where to describe licences.**

Clarify how the metadata creator should decide whether to describe the licence in *Limitations on public access* or *Use constraints*.

INSPIRE Metadata TG mentions licences under **TG Recommendation C.10:**

**metadata/2.0/rec/common/licences:** “For detailed information about the licensing of the resource it is recommended to provide a link to a licence type (e.g. <http://creativecommons.org/licenses/by/3.0>), a website or to a document containing the necessary information.” This means that INSPIRE suggests that GEMINI *Use constraints* is the appropriate place. However, GEMINI *Limitations on public access* states that its purpose is “to identify any external restrictions on access to the data such as licence arrangements.” Furthermore, in *Use constraints*, licensing is only mentioned in the guidance and the encoding guidance – but one of the examples does give licence information. Finally, “Metadata errors observed” section of each element suggests that it is an error to miss licence information out of either of them.

This could be implemented by revising both *Limitations on public access* and *Use constraints*, if the GEMINI Working Group decide that the question is clear cut.

Our preference is that *Limitations on public access* contains either “none” or the reason(s) why the data is not open data. The licence, open or not, should then be in *Use constraints*.

This has driven our specific recommendations for those two elements.

- **DD3 R6b. Strengthen the recommendation regarding linking to a licence.**

Multiple *Use constraints* are allowed. We recommend that only one should be used to hold licence information. This is implied by the current GEMINI 2.3 element guidance “if more than one type of licence is included then the URL should point to a Data Providers page.”

This should be made more explicit by deleting and adding a few words as suggested here: “*If more than one ~~type of licence alternative may be given~~ is **relevant** included then the URL should point to a Data Provider’s page **where this is explained.***”

- **DD3 R6c. Include mention of machine-readable licences**

Include a simple mention as a comment against *Use constraints* that it can link to a human readable or machine-readable licence.

## 4.2 Additional encoding

### DD3 R7. Where possible, add Schema.org “corresponding element” entries to GEMINI elements

See [DD2 R1](#) and [LIC R5](#).

We have used W3C’s recommendations for mapping from ISO 19115 to Schema.org. This table summarises the Schema.org equivalence statements given for each element below.

Whilst there is no specific DD2 recommendation concerning DCAT, we believe a DCAT2 “equivalent element” for each GEMINI element would be useful, by supporting those whose web publication of GEMINI records uses DCAT as opposed to Schema.org. Where this is easily available from the same W3C source, we have included this below. You will see that the two vocabularies are very similar, but note that:

- some of the DCAT elements sit in the DCAT “distribution” section, not their “dataset”;
- many DCAT properties have structured content, so this is not a complete list of how to implement it; and
- there are many other DCAT properties that should also be used, beyond those that exist in Schema.org (e.g. conformsTo, creator, spatialResolutionInMeters, format).

GEMINI element	Condition	Schema.org	DCAT/DCAT2 <sup>9</sup>	Notes
Title		name	dct:title	
Dataset language		inLanguage	dct:language	
Abstract		description	dct:description	
Topic category		keywords	dct:subject	
Keyword	INSPIRE theme	keywords	dcat:theme / dct:subject	
Keyword	free text	keywords	dcat:keyword	Schema.org puts all the ‘free text’ keywords in one value
Keyword	Controlled list, URL	Keywords.DefinedTerm.name Use .description for the textual content of the Anchor or CodeList Use .url for the target of the Anchor	dcat:keyword.D efinedTerm	
Temporal extent		temporalCoverage <sup>10</sup>	dct:temporal	

<sup>9</sup> Where there is a “better” term in DCAT2 than in DCAT, it appears after a “/”; the term before the “/” is the DCAT term from the W3C crosswalk list.

<sup>10</sup> Here we differ from the W3C list, which recommends Schema.org datasetTimeInterval

GEMINI element	Condition	Schema.org	DCAT/DCAT2 <sup>9</sup>	Notes
Dataset reference date	19115 dateType = publication	datePublished	dct:issued release date / issued	
Dataset reference date	19115 dateType = revised	dateModified	update date / dct:modified	
Lineage			dct:provenance	
Extent		spatialCoverage.Place.name	dct:spatial	
Resource locator.linkage	19115 function = download	contentURL (inside "distribution")	dcat:downloadURL	
Resource locator.linkage	19115 function = "information" Where the page links on to download		dcat:accessURL	
Resource locator.linkage	19115 function = "information"	url	dcat:landingPage	
Data format		encodingFormat	dct:format,	Possibly also dcat:mediaType
Responsible organisation	19115 role = publisher	publisher.Organization (with at least name, email, url)	dct:publisher	
Responsible organisation	19115 role = pointOfContact	contactPoint (probably Organisation, with at least name, email, url)	dcat:contactPoint	
Use constraints	Use constraints is being used to indicate a license	license	dct:license	
	Where GEMINI has an Anchor URL to the licence	licence.CreativeWork .abstract (with the free text) and .url (with the Anchor target URL)		
Use constraints	Other circumstances		dct:accessRights	
Bounding box		spatialCoverage.geo.GeoShape. box	dct:spatial	Note: needs translating from four edges to two corners
Resource identifier		identifier	dct:identifier	
Resource type			rdf:type	Note: DCAT-AP does not distinguish between datasets and dataset series

**DD3 R8. Provide encoding guidance on embedding Schema.org in HTML with JSON-LD**

Peer review indicated good support for the Schema.org (and DCAT) mappings and asked for more description on how GEMINI records can be published using Schema.org. Some reviews contributed to the mapping and the encoding.

This requires a new page linked from a new bullet point “displaying GEMINI in HTML” for web crawlers, on the [GEMINI main page](#).

The purpose of including web-crawler friendly “structured metadata” in the web display of a GEMINI metadata record is to improve the ranking of that page in web searches. In this it supports the display of user-friendly text from the GEMINI elements in the human readable page. This should include many if not all of the GEMINI elements. It is not so much an “additional encoding” as guidance that applies to a common display format of the GEMINI record. It is certainly feasible to produce an XSLT that transforms XML encoded GEMINI to HTML with structured metadata. One already exists to produce “plain HTML”.

Include guidance here about using the HTML head/link/@rel=canonical element to point from other representations back to a canonical version of the GEMINI record.

Parts of this may be assisted by giving “HTML metadata” equivalent elements that imply for example, GEMINI *Title* or *Alternative title* appears as HTML head/title; GEMINI Keyword should appear concatenated as head/meta/@name=keywords;

So, for example, GEMINI *Title* “OS Open Names” would be displayed in HTML as it currently is at data.gov.uk.

**Green** highlight indicates appearance of *Title* in basic HTML practice; **blue** and **purple** highlight indicates two complementary approaches to structured markup; it is not recommended to embed the Schema.org elements both ways.

```
<html>
  <head>
    <title>OS Open Names</title>
    ...
    <meta name="dc:title" content="OS Open Names"/>
    ...
  </head>
  <body itemtype="http://schema.org/Dataset">
<script type="application/ld+json">
  {"@context":"http://schema.org","@type":"Dataset","name":"OS Open Names"}
</script>
<h1 itemprop="name">OS Open Names</h1>
  </body>
</html>
```

## 4.3 Recommended new GEMINI elements and sub-elements

### DD3 R9. Add a GEMINI element identical to ISO 19115 MD\_Identification.purpose

See [DD2 R30a](#) and [DD2 R34](#) and the Authoritative Data Assessment tool produced by DD2.

This makes it clearer to users what the original purpose in collecting and publishing the data was. Note: ISO 19115 only allows a single purpose which is a free text “summary of the intentions with which the resource(s) was developed”.

If DD3 (or anyone else!) does establish a register of “purposes” then this would be best encoded with a gmx:Anchor to the purpose in that register.

Name: Purpose	
Definition	Summary of the intentions for which the resource was developed
Purpose and meaning	To make it clearer to users what the original purpose in collecting and publishing the data was.
Obligation	Optional
Occurrence	Single
Data type	Character string
Domain	Free text
Guidance	
Comment	If this element is used, the information should not be repeated in the Abstract.
Examples	Natura 2000 report
	Marine navigation
	Town planning

### Corresponding element in other standards

Standard	Name	Comparison
ISO 19115:2003	MD_Identification.purpose	Identical
ISO 19139:2007	/gmd:MD_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:purpose	Identical
Schema.org	<i>If the resource was developed for education:</i> educationalPurpose	The GEMINI element is more general

### Encoding guidelines

Guidelines	If there is a register of purposes (use cases), then include a reference to that, using the gmx:Anchor encoding approach illustrated in example 2
Example	Example 1: <pre>&lt;gmd:MD_Metadata&gt; ...   &lt;gmd:identificationInfo&gt;     &lt;gmd:MD_DataIdentification&gt;       ...       &lt;gmd:purpose&gt; </pre>
	<pre>        &lt;gco:CharacterString&gt;Town planning&lt;/gco:CharacterString&gt;       &lt;/gmd:purpose&gt;       ...     &lt;/gmd:MD_DataIdentification&gt;   &lt;/gmd:identificationInfo&gt;   ... &lt;/gmd:MD_Metadata&gt;</pre>

### DD3 R10. Add a GEMINI element equivalent to ISO 19115 MD\_Identification.resourceSpecificUsage

See [DD2 R30a](#), [DD2 R34](#) and [DD2 R37](#).



This enables the data publisher (metadata creator/editor) to add other uses which have successfully been made of the data.

ISO 19115 allows many of these, which “provides basic information about specific application(s) for which the resource(s) has/have been or is being used by different users”. It is an association to a class MD\_Usage which officially requires a “brief description” and one or more contacts for the users. Where this second part is not appropriate, then perhaps GEMINI “Resource specific usage” could be encoded as resourceSpecificUsage.MD\_Usage.specificUsage with userContactInfo explicitly missing (xsi:nil)?

Name:	
Definition	basic description of specific application(s) for which the resource(s) has/have been or is being used by different users
Purpose and meaning	An other purpose for which it has been used, beyond the original purposes for which resource was developed.
Obligation	Optional
Occurrence	Multiple
Data type	Character string
Domain	Free text
Guidance	To make it clearer to users what uses other than the original purpose the data has been used for. Give a simple description. If possible provide a link to the actual example of use.
Comment	
Examples	Conservation planning Dive planning Assessing suitability for housing development

#### Corresponding element in other standards

Standard	Name	Comparison
ISO 19115:2003	MD_Identification.resourceSpecificUsage->MD_Usage.specificUsage	Identical
ISO 19139:2007	/gmd:MD_Metadata/gmd:identificationInfo/gmd:MD_DataIdentification/gmd:resourceSpecificUsage/gmd:MD_Usage/dmg:specificUsage	Identical
Schema.org	<i>If the resource was used for education: educationalPurpose</i>	The GEMINI element is more general

#### Encoding guidelines

Guidelines	No need to provide user contact information If the use case occurs in an accessible register, use the gmx:Anchor approach shown in Example 2
Example	<p>Example 1:</p> <pre> &lt;gmd:MD_Metadata&gt;   ...   &lt;gmd:identificationInfo&gt;     &lt;gmd:MD_DataIdentification&gt;       ...       &lt;gmd:resourceSpecificUsage&gt;         &lt;gmd:MD_Usage&gt;           &lt;gmd:specificUsage&gt;             &lt;gco:CharacterString&gt;Conservation planning&lt;/gco:CharacterString&gt;           &lt;/gmd:specificUsage&gt;           &lt;gmd:userContactInfo xsi:nil='true' /&gt;         &lt;/gmd:MD_Usage&gt;       &lt;/gmd: resourceSpecificUsage &gt;     &lt;/gmd:MD_DataIdentification&gt;   &lt;/gmd:identificationInfo&gt;   ... &lt;/gmd:MD_Metadata&gt; </pre>

**DD3 R11. Add GEMINI element equivalent to MD\_Identification.status**

See [LI BPG7](#).

Use the ISO 19115-1:2014 list of values for MD\_ProgressCode, specifically because it includes a status of “superseded”.

Note that, as a child element of MD\_Identification, this element refers to the status of the resource (dataset) not the status of the metadata record.

A straw poll in a project workshop gave a variety of dataset statuses currently in use in different organisations, with no clear consensus as to which values to use. Two further sets were provided during peer review. Some organisational values probably only apply the dataset within the organisation, not when it is published. Others relate well to existing ISO values. The most useful new values appear to be withdrawn, superseded, planned and proposed.

**Yellow** rows are the values available in ISO 19115:2003. **Green** rows are those ISO 19115-1:2014 values which are used by a number of UK data publishers. Not all the ISO values have definitions which are entirely clear (for example historicalArchive and dataRequired); we recognise that the GEMINI Working Group may want to improve these.

Status Value	19115:2003	19115-1:2014	Different organisations															
accepted			✓									✓						
approved																✓	✓	
archived																		✓
completed	✓	✓		✓		✓	✓		✓	✓	✓	✓		✓	✓			
current												✓						
deprecated		✓												✓	✓			✓
draft																✓	✓	
final		✓					✓					✓		✓				
historical archive	✓	✓	✓	✓		✓	✓	✓			✓			✓	✓			
In development																		✓
not accepted		✓	✓							✓		✓						
obsolete	✓	✓				✓					✓			✓				
on going	✓	✓				✓		✓			✓	✓		✓				
operational																		✓
pending		✓	✓	✓			✓			✓		✓						
planned	✓	✓	✓	✓								✓		✓	✓			
proposed		✓	✓	✓				✓						✓	✓			
rejected																✓	✓	
required	✓	✓	✓				✓						✓	✓				
retired		✓			✓				✓						✓	✓	✓	✓
submitted																	✓	
superseded		✓			✓	✓	✓				✓	✓	✓	✓	✓			

Status Value	19115:2003	19115-1:2014	Different organisations															
tentative		✓	✓															
under development	✓	✓	✓	✓				✓		✓		✓	✓	✓	✓			
valid		✓									✓				✓			
withdrawn		✓	✓	✓	✓	✓	✓	✓				✓		✓	✓			

There is a clear relationship with the ISO 19115 sub-element 'date type' of *Dataset reference date*, which we are also recommending uses the new code lists. This overlap could be monitored, for example, a GEMINI record which includes a Dataset reference date with CI\_DateTypeCode of "superseded" should have status="superseded" as well.

Name: Status	
Definition	Indicates the lifecycle status of the resource.
Purpose and meaning	To help prospective users decide whether this dataset is appropriate for their planned use, for example if it is the most recent version.
Obligation	Optional
Occurrence	Multiple
Data type	Code list
Domain	ISO 19115-1:2014 MD_ProgressCode
Guidance	
Comment	
Examples	valid superseded historicalArchive

#### Corresponding element in other standards

Standard	Name	Comparison
ISO 19115:2003	MD_Identification.status	Identical
ISO 19139:2007	/gmd:MD_Metadata/gmd:identificationInfo/gmd:status	Identical
Schema.org	none	Schema.org/status is specifically for medical conditions, procedures, and studies

#### Encoding guidelines

Guidelines	No need to provide user contact information
Example	<pre> Example 1: &lt;gmd:MD_Metadata&gt;   ...   &lt;gmd:identificationInfo&gt;     &lt;gmd:MD_DataIdentification&gt;       ...       &lt;gmd:status&gt;         &lt;gmd:MD_ProgressCode           codeList="https://schemas.isotc211.org/19115/- 3/mcc/1.0/codelists.xml"           codeListValue="MD_ProgressCode_valid "&gt;valid&lt;/gmd:MD_ProgressCode&gt;         &lt;/gmd:status&gt;       ...     &lt;/gmd:MD_DataIdentification&gt;   &lt;/gmd:identificationInfo&gt;   ... &lt;/gmd:MD_Metadata&gt; </pre>

**DD3 R12. Proposed additional sub-element of *Keyword* called 'Keyword type',**

See [DD2 R4](#).

This is to be added alongside the Keyword value and Originating controlled vocabulary. This is particularly useful for determining which keyword is intended to convey the theme, for example to highlight it in a user interface (in data.gov.uk, called 'topic'). Note: there is an overlap between keywords of type "place" and the GEMINI / 19115 element *Extent*. It may be worth considering encoding an 'extent by keyword' in both places, but we feel that preference should be given to *Extent*.

Add Keyword sub-element "Keyword type", identical to ISO 19115 MD\_Keywords.type.

Note the overlap between keywords of type "theme" and the 19115 element MD\_Metadata.contentInfo.MDFeatureCatalogueDescription.featureTypes.

Note: We are not sure what value there is in GEMINI showing the Domain Code, given the encoding that is used. The same applies for the existing GEMINI copies of 19115 code lists.

Keyword type			
<b>Definition</b>	Subject matter used to group similar keywords		
<b>Obligation</b>	Conditional: This element should be mandatory with a value of "theme" for a keyword that gives the INSPIRE theme.		
<b>Occurrence</b>	Single		
<b>Data type</b>	Class MD_KeywordTypeCode (from ISO 19115).		
<b>Domain</b>	Name	Domain Code	Definition
	discipline	001	keyword identifies a branch of instruction or specialized learning
	place	002	keyword identifies a location
	stratum	003	keyword identifies the layer(s) of any deposited substance
	temporal	004	keyword identifies a time period related to the dataset
	theme	005	keyword identifies a particular subject or topic
	taxon	006	Keyword identifies a taxonomy of the dataset
<b>Other Comments</b>	Use the Extent element instead of Keywords of type "place".		

**Note: the newer edition of ISO 19115 (ISO 19115-1:2014) has a code list for keyword type that contains more value.**

### Encoding guidelines

To be added to the encoding guidelines of the Keyword element.

Guidelines	
Example	<pre> ... &lt;gmd:keyword&gt;   &lt;gmx:Anchor xlink:href='http://inspire.ec.europa.eu/theme/mf'&gt;Meteor ological geographical features&lt;/gmx:Anchor&gt; &lt;/gmd:keyword&gt; &lt;gmd:type&gt;   &lt;gmd:MD_KeywordTypeCode     codeList='https://schemas.isotc211.org/schemas/19139/- /resources/codelist/gmxCodelists.xml#MD_KeywordTypeCode'     codeListValue='theme'&gt;theme&lt;/gmd:MD_KeywordTypeCode&gt;   &lt;/gmd:type&gt; &lt;gmd:thesaurusName&gt;   ... </pre>

Note: the URL to the codelist given in this example is different to those given in GEMINI because the TC211 resources have moved (again!).

### DD3 R13. Add a GEMINI sub-element equivalent to LI\_Lineage source

See [LIC R7](#).

Add a GEMINI sub-element equivalent to `LI_Lineage.source`, in order to provide a better way for a dataset that is derived from other datasets to acknowledge its sources.

This may require redefining the existing GEMINI *Lineage* element to be “Lineage statement”.

Note, the ISO 19115 model for this is quite complex, with the most likely path being that `LI_Lineage.source.LI_Source.sourceCitation.CI_Citation.identifier.MD_Identifier.code` matching the Resource identifier of the source – possibly by both carrying Anchors to the same URL.

Note: ISO 19115 says “Either the “description” or “sourceExtent” element of `LI_Source` must be documented”, so it would be necessary to provide one of them in addition to the ‘identifier.code’

Another possibility is for the metadata of the source (i.e. the dataset that expects to be reused!) to provide a DOI or a full `LI_Source` object which can be referenced by `gmd:source xlink:href`. At present, there is a hint about DOI use hidden in the encoding guidance for *Alternative title*. Consider whether *Alternative title* or *Resource identifier* is the more appropriate place to put a DOI that re-users should use.

	<b>Source document</b>		
<b>Definition</b>	information about the source data used in creating the resource		
<b>Obligation</b>	Conditional (within the context of Lineage): mandatory if statement not provided		
<b>Occurrence</b>	Multiple		
<b>Data type</b>	CharacterString		
<b>Domain</b>	Lineage source itself has two sub-elements both of which need to be populated:		
		Description	Code
	Definition	Description of the source data	Reference of the source data
	Obligation	Mandatory within a Lineage source	Mandatory within a Lineage source
	Occurrence	Single	Single
	Data type	CharacterString	CharacterString
	Domain		
	Comment		Matching the <i>Resource identifier</i> of the source
<b>Other Comments</b>	Should match the Resource identifier of the cited source dataset. It is intended so that people assessing the dataset can easily find the source datasets that were used to produce it.		

#### Corresponding element in other standards

Standard	Name	Comparison
ISO 19115:2003	<code>LI_Lineage.source.LI_Source.sourceCitation.CI_Citation.identifier.MD_Identifier.code</code>	Identical
ISO 19139:2007	<code>gmd:LI_Lineage/gmd:source/gmd:LI_Source/gmd:sourceCitation/gmd:CI_Citation/gmd:identifier/gmd:MD_Identifier/gmd:code</code>	Identical
Schema.org	none	

#### Encoding guidelines

To be added to the encoding guidelines of the Lineage element.

Guidelines	
Example	<pre> &lt;gmd:lineage&gt;   &lt;gmd:LI_Lineage&gt;     &lt;gmd:statement&gt;       &lt;gco:CharacterString&gt;derived from OS imagery&lt;/gco:CharacterString&gt;     &lt;gmd:source&gt;       &lt;gmd:LI_Source&gt;         &lt;gmd:description&gt;           &lt;gmd:CharacterString&gt;OS MasterMap Imagery Layer&lt;/gmd:CharacterString&gt;         &lt;/gmd:description&gt;         &lt;gmd:sourceCitation&gt;           &lt;gmd:CI_Citation&gt; </pre>

```

<gmd:title xsi:nil="true"/>
<gmd:date xsi:nil="true"/>
<gmd:identifier>
  <gmd:MD_Identifier>
    <gmd:code>
      <gco:CharacterString>OS MasterMap Imagery Laye
r</gco:CharacterString>
    </gmd:code>
  </gmd:MD_Identifier>
</gmd:identifier>
<gmd:CI_Citation>
  <gmd:sourceCitation>
    </gmd:LI_Source>
  </gmd:source>
</gmd:statement>
</gmd:LI_Lineage>
</gmd:lineage>

```

## 4.4 Revision of GEMINI element guidance

### DD3 R14 Improve the per-element guidance in a number of ways

This section pulls together the recommendations above to show their impact on specific GEMINI elements. It also adds some other minor changes to the guidance for specific elements.

#### 4.4.1 GEMINI element *Title*

**Add Schema.org equivalent** element of “name” and DCAT2 equivalent of “dct:title”, as described in [D3 R1](#).

Consider adjusting the guidance to reflect the terms suggested by the “General” section on language to use. See [DD3 R4](#).

#### 4.4.2 GEMINI element *Alternative title*

**Correction:** the second sentence of the encoding guideline says something about “example 2” which isn’t true. Was the intention to introduce a GEMINI element equivalent to CI\_Citation.otherCitationDetails?

**Add guidance** like “Where *Title* is a formal (pre-existing) title, then use *Alternative title* for short (friendly) ones”. This, in conjunction with recommendations on HTML encoding for crawling, is to improve SEO performance of resulting web-crawled pages.

#### 4.4.3 GEMINI element *Resource language*

**Add Schema.org equivalent** element of “inLanguage” and DCAT2 equivalent of “dct:language”,

#### 4.4.4 GEMINI element *Abstract*

**Add Schema.org equivalent** element “Description” and DCAT2 equivalent of “dct:description”.

#### 4.4.5 GEMINI element *Topic category*

Add DCAT2 equivalent element of “dct:subject”.

#### 4.4.6 GEMINI element *Keyword*

##### **Schema.org**

**Add Schema.org equivalent** element of “keywords” and DCAT2 equivalent of “keyword” and “dcat:theme”,  
Note: Schema.org puts all the free text keywords in one concatenated string value.

##### **Controlled vocabularies**

See [DD3 R5](#).

Move guidance bullet point 5 higher in the list, to give priority to the INSPIRE themes, and make this mandatory to conform to INSPIRE Metadata TG Requirement 1.4: metadata/2.0/req/datasets-and-series/inspire-theme-keyword.

Add further example/recommended vocabularies to the list at guidance bullet point 2: the INSPIRE feature types; the NERC Vocab server; possibly the higher levels of the GC taxonomy being created as DD3-1; SWEET (<https://bioportal.bioontology.org/ontologies/SWEET>); AGROVOC (<http://aims.fao.org/standards/agrovoc/functionalities/search>).

##### **Identifier schemes**

To better support users who wish to link data with other data, it would be useful to encourage the use of *Keyword* to indicate identifier schemes that are in use within the dataset, such as UPRN, USRN.

This would be best supported by someone establishing a register of identifier schemes so that the keyword could include an anchor to the registered item.

Note that there could even be an additional KeywordTypeCode value of ‘identifier scheme’.

##### **Sub-element: keyword type**

See proposed additional sub-element in [DD3 R12](#).

Add to ‘comment’ something like: “The *Extent* element should be used in preference to a Keyword of type place.”

#### 4.4.7 GEMINI element *Temporal extent*

**Add Schema.org equivalent** element of temporalCoverage and DCAT2 equivalent of “dct:temporal”,

Sub-element endPosition: add Schema.org equivalent element of dateModified.

#### 4.4.8 GEMINI element *Dataset reference date*

**Add Schema.org equivalent** element of datePublished and DCAT2 equivalent of “dct:issued” (where 19115 dateType = publication).

**Add Schema.org equivalent** element of dateModified and DCAT2 equivalent of “dct:modified” (where 19115 dateType = revised).

Allow use of date types from the ISO 19115-1:2014 CD\_DateTypeCode list. These would be on an additional Dataset reference date with a type like “deprecated”, “superseded”. It would still be important to keep at least one published/revised date.

#### 4.4.9 GEMINI element *Lineage*

**Add** DCAT2 equivalent of “dct:provenance”

**Add new sub-element**, see [DD3 R13](#).

#### 4.4.10 GEMINI element *Extent*

**Add Schema.org equivalent** element of spatial.Place.name and DCAT2 equivalent of “dct:spatial”.

See [DD3 R4](#).

Add to ‘comment’ something like: “This element should be used in preference to a Keyword of type place.”

Add an example of a statistical unit, such as ONS London Borough ‘output area’ Royal Borough of Greenwich (E09000011) <http://statistics.data.gov.uk/id/statistical-geography/E09000011>.

#### 4.4.11 GEMINI element *Resource locator*, linkage sub-element

**Add Schema.org equivalent** element of “url” and DCAT2 equivalent of “dcat:landingPage” or “dcat:accessURL, where 19115 function = information. Note: accessURL is more relevant where the target page then allows download.

**Add Schema.org equivalent** element of “contentURL” and DCAT2 equivalent of “downloadURL” where 19115 function = download.

See GEMINI bug tracker 2020-26.

Expand guidance on “function” sub element to match the useful distinction in DCAT and clarify which values apply when, based on INSPIRE Metadata TG p104.

Mention that WMS is “information” (INSPIRE Metadata TG example at C.2.4), and “download” “*SHOULD* be used for the URL at which this distribution is available directly, typically through a HTTP Get request.” (DCAT:downloadURL)

#### 4.4.12 GEMINI element *Responsible organisation*

**Add Schema.org equivalent** element “publisher.Organization” where 19115 role = publisher or “contactPoint” where 19115 role = pointOfContact. DCAT dct:publisher / dct:contactPoint.

Schema.org contactPoint should be implemented with Schema.org Organisation.

Sub-element mappings: where available, each Organisation should have name, email, url.

#### 4.4.13 GEMINI element *Limitations on public access*

See [DD3 R6a](#).



Should contain either “none” or the reason(s) why the data is not open data. Therefore, we recommend:

- **rename** *Limitations on public access* to something like *Reasons for not being open*;
- **delete** “such as licence arrangements” from the purpose; and
- **delete** the first “Errors observed” (the one about licence).

Make it clearer that there are effectively two “sub-elements” – the xlink to the INSPIRE category of reason for limiting public access, and the free text detail. This is currently hidden in the (XML) encoding guidelines.

#### 4.4.14 GEMINI element *Use constraints*

**Add Schema.org equivalent** element of “license” (DCAT “dct:licence”) but only where the GEMINI element is being used for a licence. DCAT “dct:accessRights” may be appropriate in other circumstances.

See [DD3 R6a](#) and [DD3 6b](#).

**Explicitly mention** “licence” in the purpose.

**Reword guidance** specifically to indicate that although multiple *Use constraints* are allowed, only one can refer to licencing. Improve the last item in the Encoding guidelines to reinforce this.

Encourage the use of “Anchor” links to a licence, as per INSPIRE Metadata TG Recommendation C.10.

Currently:

*“Provide information on any constraints to using the resource, e.g. licensing, fees, usage restrictions, or refer to a URL where this information is available, e.g. a licence document. If entering a URL, enter this as a sub-element, not as part of free text. Where relevant, Data Provider licence information should be provided in the form of a Licence Title, and where possible, a licence URL. If more than one type of licence is included then the URL should point to a Data Providers page.”*

Preferred (emphasis/strikeout for clarity in this document):

*“Provide information on any constraints to using the resource, e.g. licensing, fees, usage restrictions, ~~or refer to a URL where this information is available, e.g. a licence document.~~ **preferably by using the URL of where this information is available, e.g. a licence document.** If entering a URL, enter this as a sub-element, not as part of free text. ~~Where relevant, Data Provider licence information should be provided in the form of a Licence Title, and where possible, a licence URL.~~ If more than one ~~type of licence alternative may be given~~ **relevant** ~~included~~ then the URL should point to a Data Providers page **where this is explained.**”*

#### 4.4.15 GEMINI element *Resource identifier*

**Add Schema.org and DCAT equivalent element** of ‘dct:identifier’.

##### DD3 R14a Improve guidance on designing identifiers

For example:

- ensure assignments are fixed - do not modify or reuse identifiers;
- maximise traceability over time - share rules for changes, retirement and links from old to new;
- don’t code changeable details into identifiers e.g. version numbers, names, organisations, etc;
- define a single preferred presentation - capitals, spaces, underscores etc.; and

- make identifiers web-friendly - use only unreserved characters, that is:
  - avoid HTML reserved characters ( " , & < > ); and
  - avoid URI reserved characters ( ! \* ' ( ) ; : @ & = + \$ , / ? # [ ] ) except for their specific uses in a URI if your identifier is an entire URI.

#### 4.4.16 GEMINI element *Conformity*

Use for Authoritative Data Assessment result by having a citation to the “authoritative data” concept (as a conformity specification) with the explanation giving the level (gold, silver, bronze).

This will only be possible if and when the Geospatial Commission publishes the concepts in a way that can be cited.

Note, the other aspect of the ADA result is a data quality statement.

#### 4.4.17 GEMINI element *Bounding box*

**Add Schema.org equivalent** element of geo:GeoShape.box and DCAT equivalent of dct:spatial. Note, this will need translating from four edges in GEMINI to two corners in Schema.org.

##### **DD3 R14b More precise spatial extents can be provided**

Add a comment that other more precise spatial extents can be provided using other choices within ISO 19115 EX\_Extent.

## Annex A: Example HTML / Schema.org encoding

A GEMINI record with this content:

Element	Value	
1. Title	OS Postcodes data	
2. Dataset language	eng	
4. Abstract	Available for England, Scotland and Wales in a number of Ordnance Survey Products ...	
5. Topic Category	location	
6. Keyword	Postcode Area Postcode District	
7. Temporal extent	{unknown, 2018-12-20}	
8. Dataset reference date	2019-02	revised
10. Lineage	A mix of Royal Mail, local authority, and OS information	
15. Extent	Great Britain	
17. Spatial reference system	<a href="http://www.opengis.net/def/crs/EPSG/0/27700">http://www.opengis.net/def/crs/EPSG/0/27700</a>	
18. Equivalent scale	1250	
19. Resource locator	<a href="https://os.uk/business-and-government/help-and-support/products/code-point-open.html">https://os.uk/business-and-government/help-and-support/products/code-point-open.html</a>	name: Codepoint Open Product description  function: information
21. Data format	SHP	
23. Responsible organisation	Ordnance Survey +44 3456 050505 os.data@os.uk	publisher
24. Limitations on public access	no restrictions	
25. Use constraints	<a href="https://os.uk/business-and-government/licensing/index.html">https://os.uk/business-and-government/licensing/index.html</a>  Licences and agreements explained	
30. Metadata date	2019-03-05T11:43:31	
33. Metadata language	eng	
35. Metadata point of contact	Data Office, ....	
36. Resource identifier	OS Postcodes data	
41. Conformity	OS Postcode data conforms to the Codepoint, Codepoint Open and Codepoint with Polygons product specifications.	
44. Bounding box	{-8.45, 1.78, 60.86, 49.86}	
45. File identifier	28179b87-559b-49de-9fe7-d628c4779271	

Could sensibly appear like this.

Note: this has not been validated and is certainly not the only way to display a GEMINI record in HTML; it is mainly intended to show one approach to embed Schema.org elements, encoded in JSON-LD. It is also possible to place individual schema.org elements within particular HTML elements – and some consider that approach preferable.

Note, it is very likely that a lot of additional HTML code would provide styling and other display elements.

Note, **green highlight** shows simple HTML micro tagging, as an alternative way of embedding the Schema.org values.

```
<html>
  <head>
    <title>OS Postcodes data</title>
    <meta name="dc:title" content="OS Postcodes data"/>
    <meta name="dc:creator" content="Ordnance Survey"/>
    <meta name="dc:date" content="2019-03-05"/>
    <meta name="dc:language" scheme="DCTERMS.ISO639-2" content="eng"/> <!--
metadata language -->
  </head>
  <body itemscope itemtype="http://Schema.org./Dataset">
    <script type="application/ld+json">
      { "@context": "http://schema.org",
        "@type": "Dataset",
        "name": "OS Postcodes data",
        "inLanguage": "eng",
        "description": "Available for England, Scotland and Wales in a number of
Ordnance Survey Products ...",
        "keywords": {
          "@type": "DefinedTerm",
          "inDefinedTermSet": { "name": "MD_TopicCategoryCode" },
          "name": "location" },
        "keywords": "Postcode Area, Postcode District",
        "temporalCoverage": ".. /2018-12-20",
        "dateModified": "2019-02",
        "spatialCoverage": { "@type": "Place", "name": "Great Britain" },
        "url": "https://os.uk/business-and-government/help-and-
support/products/code-point-open.html",
        "encodingFormat": "SHP",
        "publisher": {
          "@type": "Organization",
          "name": "Ordnance Survey",
          "telephone": "+44 3456 050505",
          "email": "os.data@os.uk" },
        "license": {
          "@type": "CreativeWork",
          "abstract": "Licences and agreements explained",
          "url": "https://os.uk/business-and-government/licensing/index.html" },
        "spatialCoverage": {
          "@type": "Place",
```

```

    "geo":{
      "@type":"GeoShape", "box":"49.86,-8.45 60.86,1.78"}
    },
    "identifier":"OS Postcodes data",
  } </script>
<!-- human readable page starts here -->
  <p title="Title" itemprop="name">OS postcodes data</p>
  <p title="Abstract" itemprop="description">A mix of Royal Mail, local
authority, and OS information</p>
  <p title="Topic category" itemprop="name">location</p>
  <p title="Keywords" itemprop="keywords">Postcode Area, Postcode
District</p>
  <p title="Lineage">Available for England, Scotland and Wales in a number
of Ordnance Survey Products ...</p>
  <p title="Extent" itemprop="spatialCoverage">Great Britain</p>
  <p title="Resource locator - information" itemprop="url"><a
xlink:href="https://os.uk/business-and-government/help-and-
support/products/code-point-open.html">Codepoint Open Product
description</a></p>
  <p title="Spatial reference system"><a xlink:href="
http://www.opengis.net/def/crs/EPSSG/0/27700">http://www.opengis.net/def/crs/
EPSSG/0/27700</p>
  <p title="Equivalent scale">1:1250</p>
  <p title="Data format" itemprop="encodingFormat">SHP</p>
  <p title="Responsible organisation - publisher"
itemprop="publisher">Ordnance Survey</p>
  <p title="Limitations on public access">no restrictions on public
access</p>
  <p title="Use constraints" itemprop="license"><a
xlink:href="https://os.uk/business-and-
government/licensing/index.html">Licences and agreements explained</a></p>
  <p title="Conformity">OS Postcode data conforms to the Codepoint,
Codepoint Open and Codepoint with Polygons product specifications</p>
</body>
</html>

```

# Annex B: Discussion of Intellectual Property Rights

## UK GEMINI

AGI publish UK GEMINI 2.3 under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/). This is explicit on many pages; we believe it applies to all the GEMINI 2.3 material at <https://www.agi.org.uk/gemini/40-gemini/1037-uk-gemini-standard-and-inspire-implementing-rules>

We assume that any amended version of GEMINI in response to this document will be published under the same – or equivalent - licence.

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## Other material

The remainder of this document represents the original work of the contracted partners in this project, and is therefore believed to be the copyright of the Geospatial Commission.

## Annex C Informative UML Diagram

Note: the Enterprise Architect project used to create this diagram will be handed over the AGI in order that they can maintain it – and also decide what's most useful to publish.

This diagram takes a simple approach to illustrating the relationships between the GEMINI elements and sub-elements. We imported the relevant classes from the ISO TC211 model for ISO 19115:2003 and annotated it with UML comments to indicate which elements appear in GEMINI.

Yellow classes are the new elements being requested in this document.



