Draft proposals for a consistent approach to SuDS asset recording

Supporting information for questionnaire responses

HR Wallingford has been appointed by Water UK to:

- Define a data model for recording SuDS asset data;
- Define the SuDS data attributes that should be recorded;
- Recommend the referencing of SuDS structures for use by sewerage undertakers; and
- To consider the representation of SuDS features on sewerage plans.

A review document has been drafted to summarise current practice and future options. The objective of this short statement is to summarise the recommendations made by the review document so that those responding to the questionnaire have additional information on which to comment, if appropriate.

Questionnaires have been developed for the following stakeholder groups:

- Developers;
- Sewerage undertakers;
- Local authorities (Planning and Lead Local Flood Authorities);
- SuDS asset management companies.

A workshop is planned at which detailed discussions on the feedback received and the draft proposals will take place. The workshop is planned for:

13th November in London at Broadway House (Stephenson Room).

1. SuDS asset referencing

STC25 is the referencing convention used for referencing sewer node data (manhole and other ancillary sewer items). It was created from work carried out by the Standing Technical Committee on drainage from their Report No. 25 on Sewer and Water Main Records (STC25, 1980).

The STC25 system is based on the Ordnance Survey cartographic subdivision across the UK and Ireland which uses an alpha-numeric system. Two letters are used to define the 100km x 100km grid point and then 4 numbers – two for northings followed by two for eastings - define the 1km grid, followed by 2 numbers – 1 for the northing and one for the easting – to give the 100m grid. Within each 100m grid every manhole is allocated a unique identifier, a number from 01 to 99 which is not coordinate related.

An explanation of the STC25 Reference is shown in Figure 1.

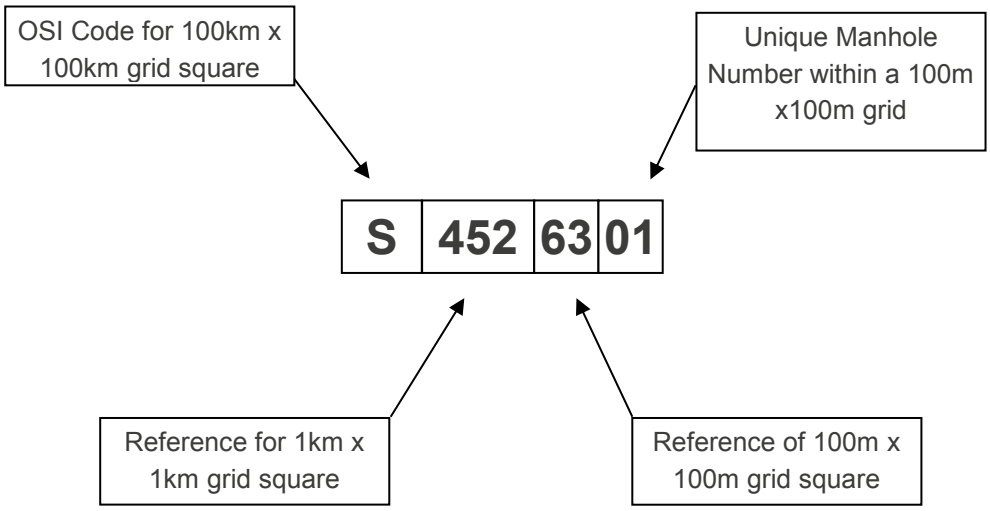

Figure 1: STC25 referencing system

Some sewerage undertakers have extended the use of STC25 from the limiting 100 items of the original approach by using alpha numeric values (0a through to zz) which provides over 1200 potential references for each 100m grid.

Recommendation

- **All SuDS points of relevance inlets and outlets would be given a node with an STC25 ID.**
- **The ID would not have a value which indicates that it is a SuDS unit.**
- **The whole SuDS unit would also be given a separate point in space (the SuDS unit centroid) with an STC25 ID.**

2. Mapping of SuDS

It is proposed to have node references for each SuDS element and SuDS sub-element such as a pipe outfalling into the SuDS unit. These nodes all need to be identified using some symbol. It is proposed that these nodes do not attempt to use symbolism which indicates the type of SuDS unit, but must show differentiation from manholes and other current sewerage symbols.

Similarly the connectivity shown on sewerage maps also needs to be preserved to show the flow path even though there is no conduit connecting inlets with outlets. Indicative links are therefore needed to show flow paths.

Recommendations

- **The use of a circular node with a letter S within it for SuDS sub-nodes;**
- **The use of a square with S1, S2 or S3 within it to represent the centroid of the whole SuDS unit;**
- **S1, S2, S3 would differentiate between roof related SuDS, surface SuDS and underground SuDS;**
- **The use of indicative links connecting nodes to show the flow path;**
- **No representation of the plan area of the SuDS units (as the default position, although this can be shown on plans when appropriate).**

Figure 2 shows a draft plan of just nodes and sub-nodes and network connectivity.

Figures 3 and 4 show how one of the area attributes recorded for a SuDS unit could also be shown on the plan if this was considered necessary.

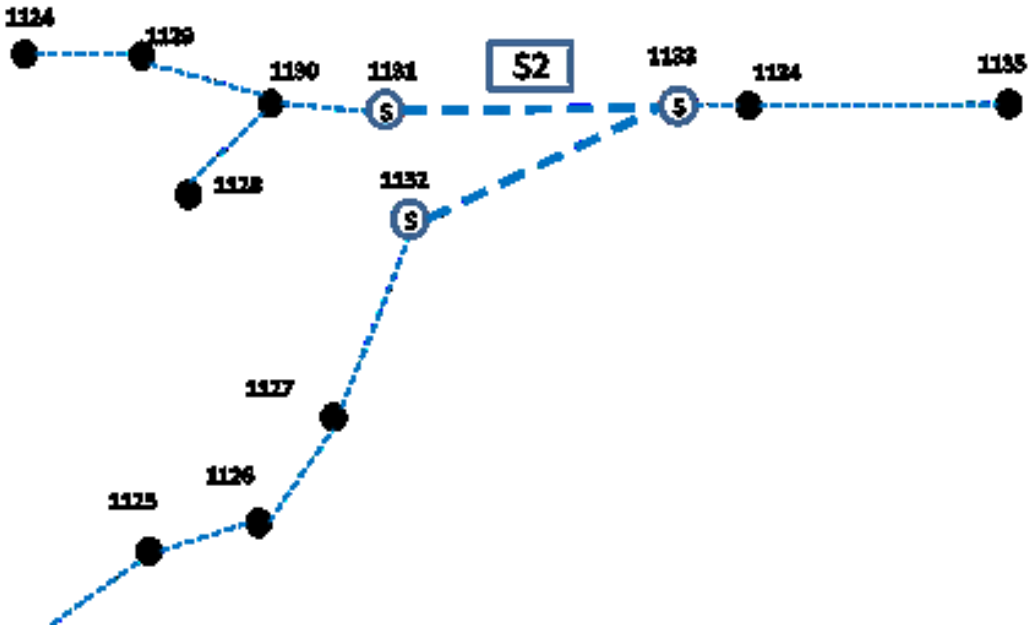

Figure 2: Mapping of a SuDS pond – sewer mapping nodes and connectivity

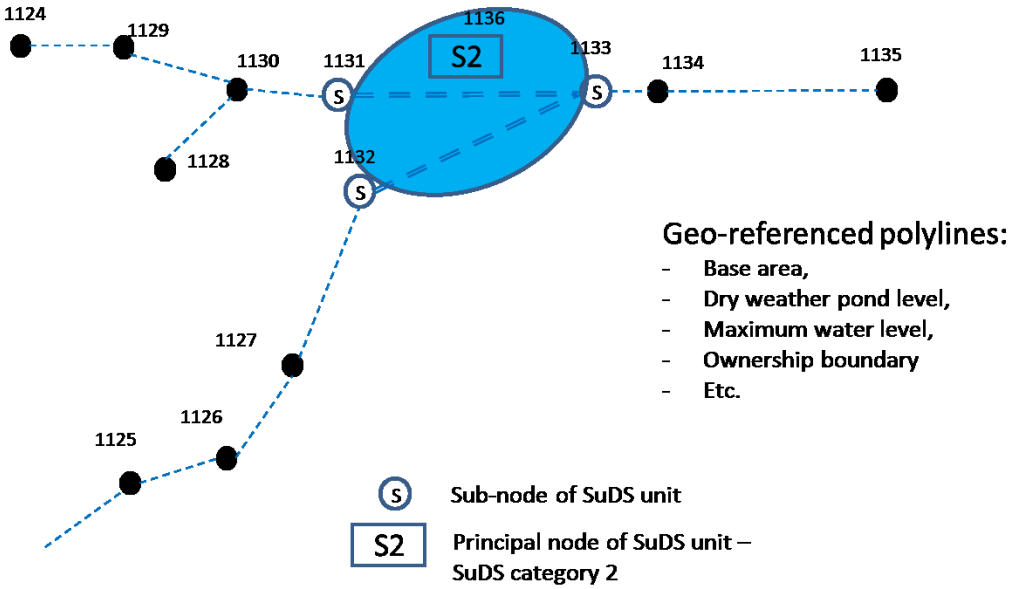

Figure 3: Mapping of a SuDS pond – sewer mapping nodes, connectivity and area extents

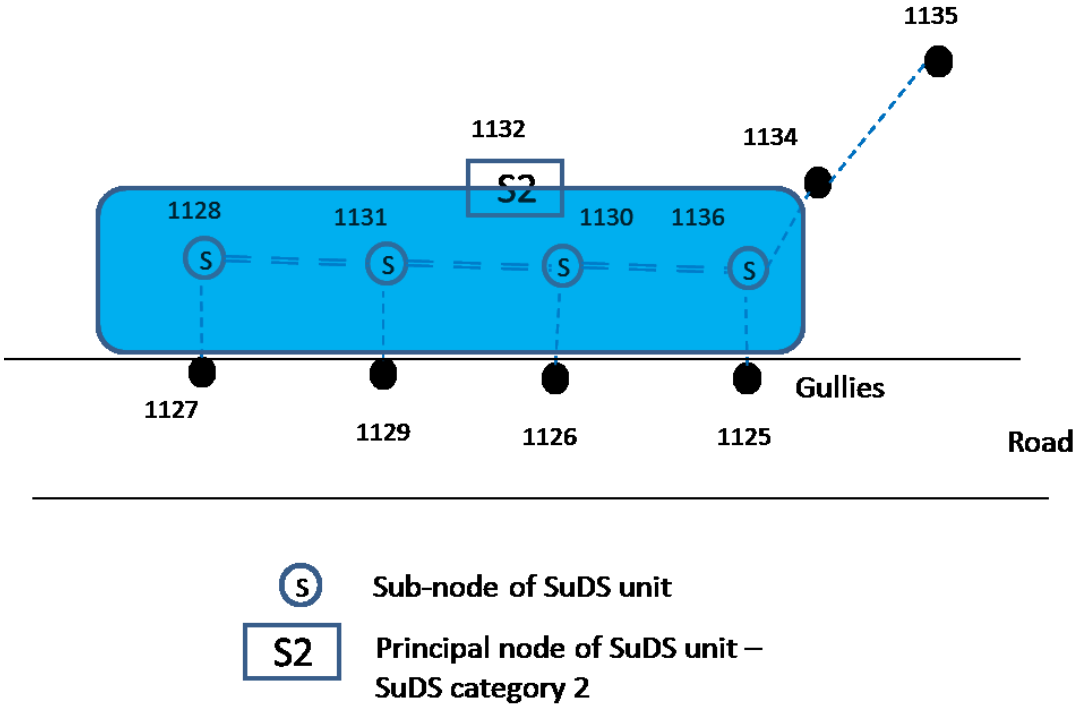

Figure 4: Mapping of a swale – sewer mapping nodes, connectivity and area extents

3. SuDS asset data requirements

SuDS attribute information that could be recorded is extensive and if a complete understanding is to be gained as to its intended behaviour then a lot of information needs to be recorded. Data could be differentiated by those that were a requirement of planning and/or adoption, and data that would be preferred but is not essential. The following categories have been defined.

- SuDS types
- Ownership
- Location
- Reference
- Connectivity
- Dimensions
- Construction details
- Contributing areas
- Hydraulic design criteria
- Water quality design criteria
- Amenity / Environmental criteria
- Operation and management plan
- Operation and management record.
- Manufactured products.

Questionnaire responses and the proposed project workshop will be used to define which of this data must be provided as part of the planning approval and adoption process.

The following draft SuDS types and categories have been specifically defined.

Roof systems – type 1 SuDS

Green roof

- Grasses
- Sedums
- Garden (Extensive)

Blue roof.

Surface systems – type 2 SuDS

Basin

Bioretention

Filter strip

Filter drain

Permeable pavements

- Concrete block
- Porous asphalt

Pond

- Wetland
- Open water
- Wetland & Open water

Swale

- Conveyance
- Under-drained

Tree pits.

Underground systems – type 3 SuDS

Proprietary products

- Water quality (settlement)
- Water quality (filtration)
- Water quality (treatment channels)
- Water quality (oil separators)

Rainwater harvesting tanks

- Resource conservation
- Passive stormwater control
- Active stormwater control

Soakaway

- Standard
- Infiltration trench
- Infiltration basin

Tank storage

- High voids crate
- Granular storage.

4. SuDS Data Model and transfer

4.1. Data model

The data model describes a set of database tables and their relationships that allow data about the various SuDS types and their attributes to be stored by relational database software. The version shown here (Figure 5**Error! Reference source not found.**) provides an indication of the data model structure.

The data model aims to be sufficiently flexible to allow data for all types of asset to be stored in a common set of database tables while ensuring that all types of data can be recorded.

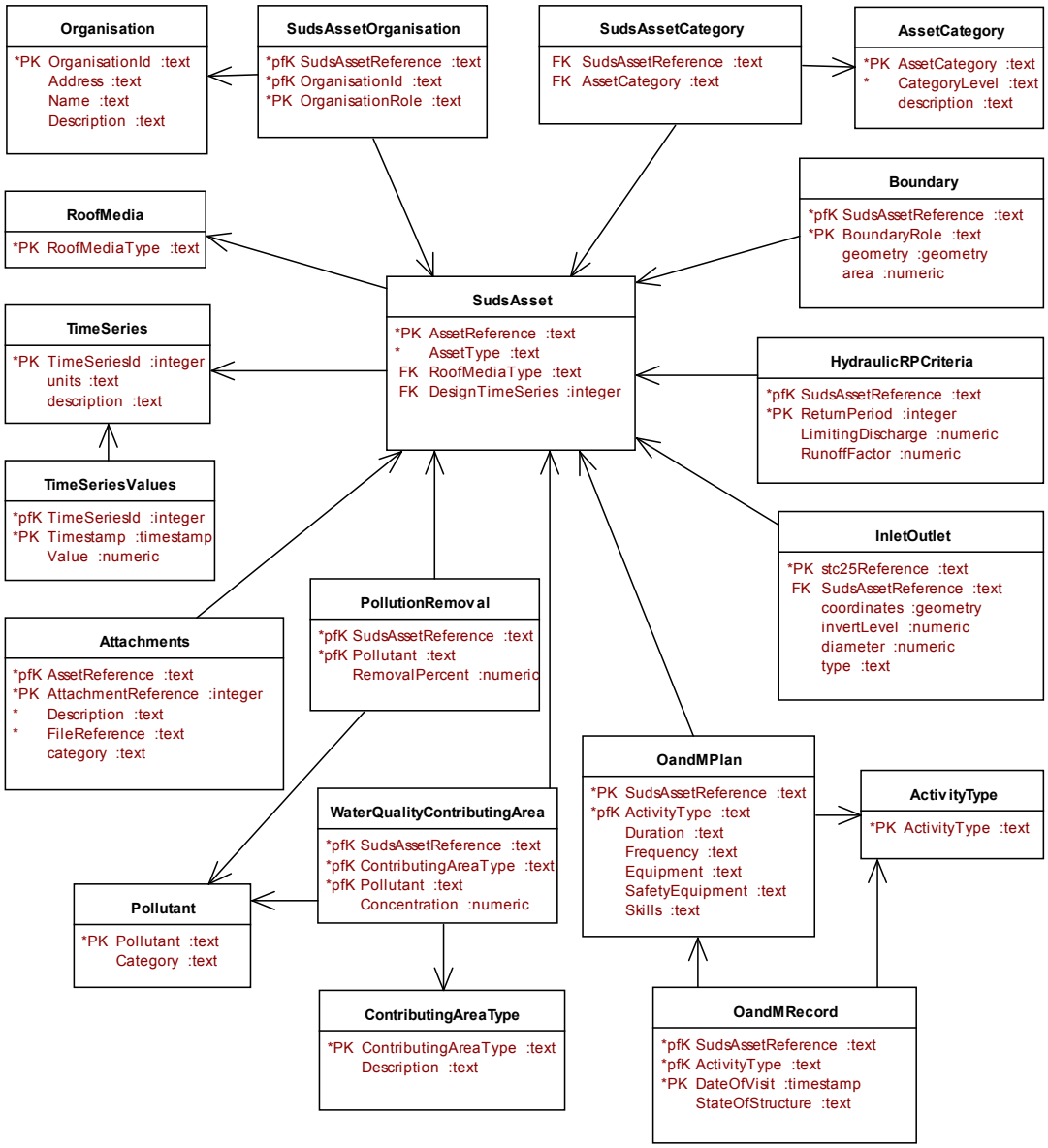

Figure 5: Data Model

4.2. Data storage and transfer

This data model is shown as a traditional relational data model. It is semi-abstract in that the data types are not specific to a particular relational database implementation.

The data model could also be implemented using non-relational software, such as NoSQL databases, XML or JSON formatted text files. The only requirement placed on an implementation is that it must be able to support the data types and relationships expressed by the model and maintain the referential integrity of the data.

An important consideration when choosing the transfer format is whether or not the data is primarily considered to be spatial; if it is essential that it can be read directly into GIS software then a geospatial format must be used. Only a small part of the model represents spatial data – the asset boundaries, inlets and outlets – and the more complex parts of the data model are not naturally supported by some geospatial formats.

Recommendations

- **We recommend the use of XML document format and associated XSD schema for transferring SuDS asset data between organisations, but SQLite/GeoPackage approach would be an alternative.**

5. Implementation strategy for effective recording of SuDS information

The approval of new surface water drainage infrastructure will remain part of the development planning approval process. The only stakeholder, therefore, with sight of all proposals for new drainage assets (from both private developers and company development applications) is the local planning authority; and therefore it is likely that any asset data collection and recording process would be best linked to and required as part of the planning process.

A bespoke tool or facility similar to the planning portal would help in enabling this obligation. Without such a tool it is likely that the ease of requiring and providing data, the data checking process, and data consistency will be put at risk.

Any strategy will require the full support of central and local government, the environmental regulators, asset approval and adoption bodies and developers and their consultants.