DIGITAL MAPPING TECHNIQUES 2019

The following was presented at DMT'19
(May 19 – 22, 2019 - Montana Technological University)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2019)

http://ngmdb.usgs.gov/info/dmt/

Examples of new and legacy NCGMP09/GeMS-compliant geodatabases from Kansas

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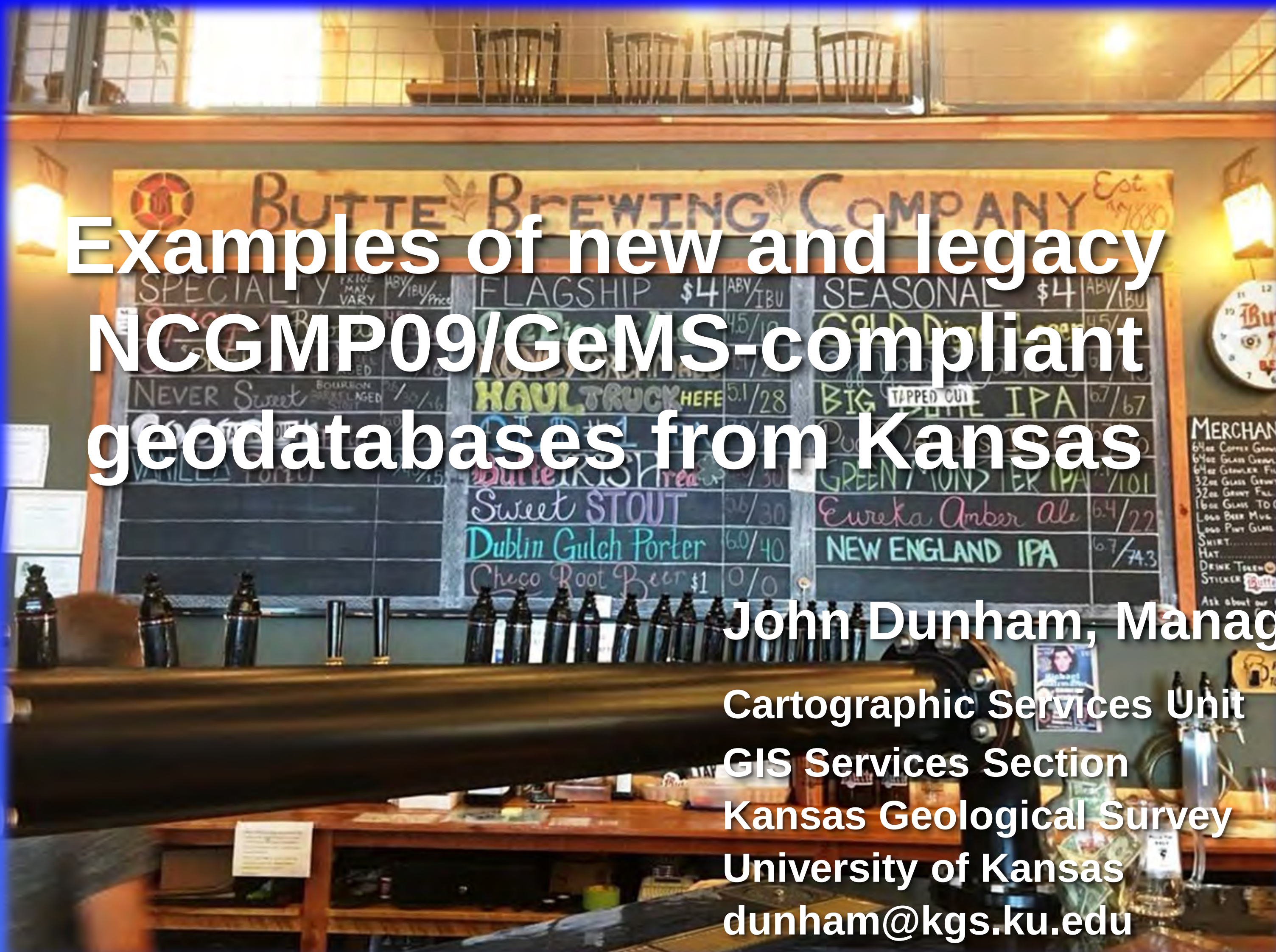
ABSTRACT

KGS' main geologic map series is organized by county. Before GIS, most were bulletins, last published in 1974 – books including a geologic map, providing a wealth of information. In the KGS GIS era (1988-present), map products range from recent, well-documented projects to which geodatabase standards can be relatively easily applied, to older legacy maps presenting problems due to scarcity of information other than the map. The GeMS standard provides a framework for national and interstate data cooperation, and for getting valuable information to the user, who has a right to know the history, quality, and background of the geologic data. Many resources are now available to encourage use of GeMS. KGS is moving toward converting as many geology geodatabases as possible to GeMS – this presentation provides examples with both recent and older county geology data.

Examples of new and legacy NCGMP09/GeMS-compliant geodatabases from Kansas



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Background

- KGS' main geologic map series is organized by county. Before GIS, most were produced as bulletins – essentially books including a map of the county geology, providing a wealth of information. The last bulletins were published in 1974.
- In the KGS GIS era (1988-present), map products range from recent, well-documented projects to which the standard can be relatively easily applied, to older legacy maps which can present problems due to scarcity of information other than the map.

Reasons for the standard

- Much-discussed reasons
  - In the near future, StateMap deliverables will include GeMS-compliant data for all the reasons discussed earlier here at DMT;
  - Greater ease in assembling a national set of geology GIS data;
  - Data sharing between federal, state and other governmental units.

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Less discussed, but very important

- The map/data user
  - The end user has a right to know, as best as we can deliver, the history, quality, and background of the data;
    - Detailed attributes of the geology;
    - Methodology – how the data was created;
    - Resources used to create the data;
    - When the data was created, detailing the process steps where possible.

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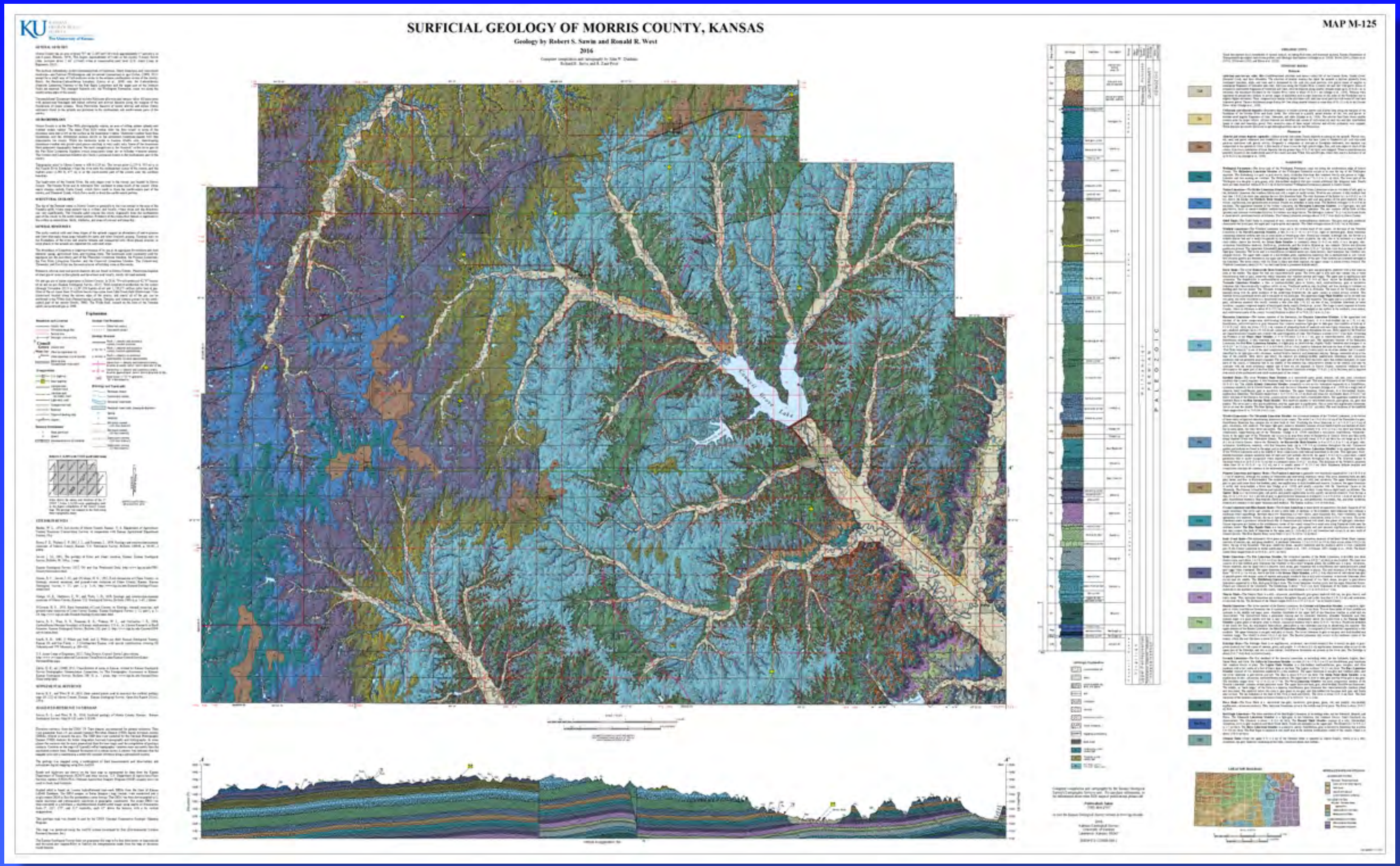
GeMS provides a framework

- A ready-made system for getting information to the user
  - Contains required, as-needed, and optional elements that should fulfill most data users’ needs;
  - Many resources are now available to encourage use: https://ngmdb.usgs.gov/Info/standards/GeMS/
    - GeMS Toolkit – ArcGIS tools for the schema;
    - Example maps;
    - Pilot projects;
    - Extensive documentation;
  - One drawback – staff time/resource commitment.

Example 1 – Morris County, KS



- Map released in 2016, NCGMP09 version soon afterward:
  - All steps documented by mapping geologists;
  - Methodology included extensive fieldwork, GPS, mapping in ArcGIS using imagery and DEMs;
  - Detailed geologic descriptions and accompanying text.

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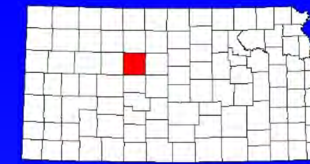
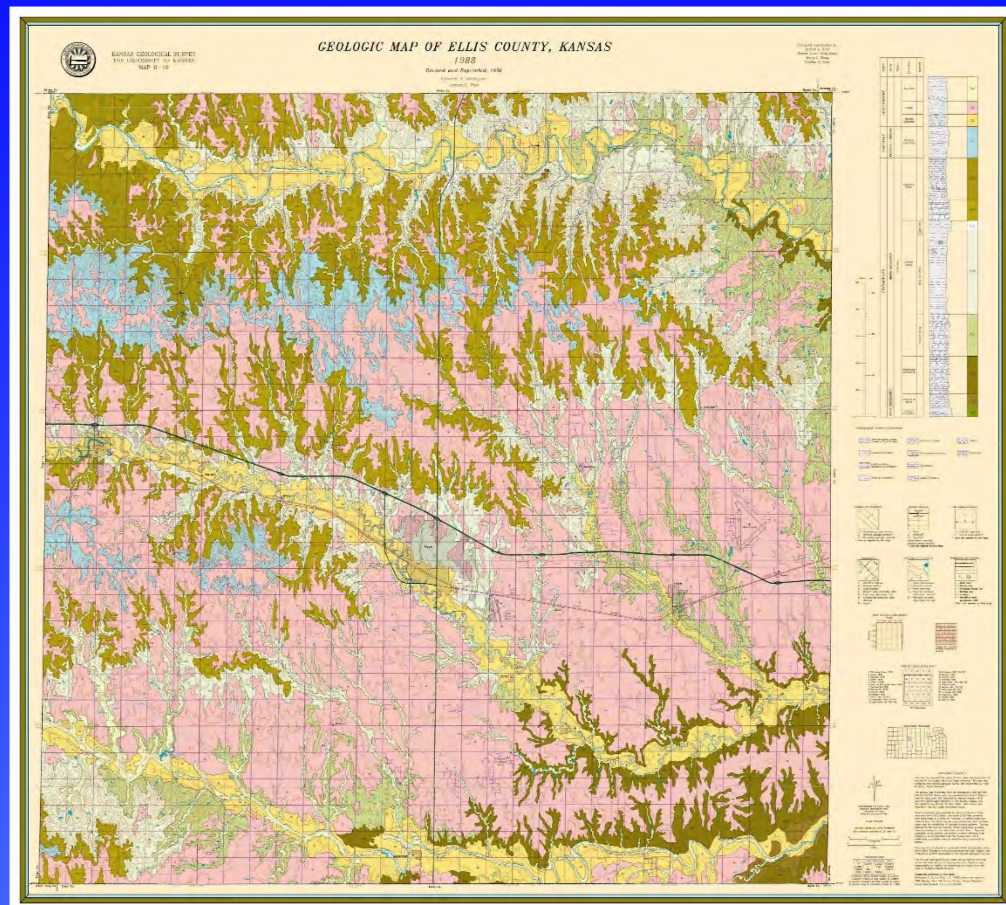
Example 2 – Ellis County, KS





- Map released in 1988 (updated 1996), NCGMP09 version in 2014:
  - First GIS map, created using proprietary software, data converted to Esri format;
  - Methodology was primarily extrapolating geology from county soil survey sheets;
  - Legacy map requiring much investigation to assemble NCGMP09 product.

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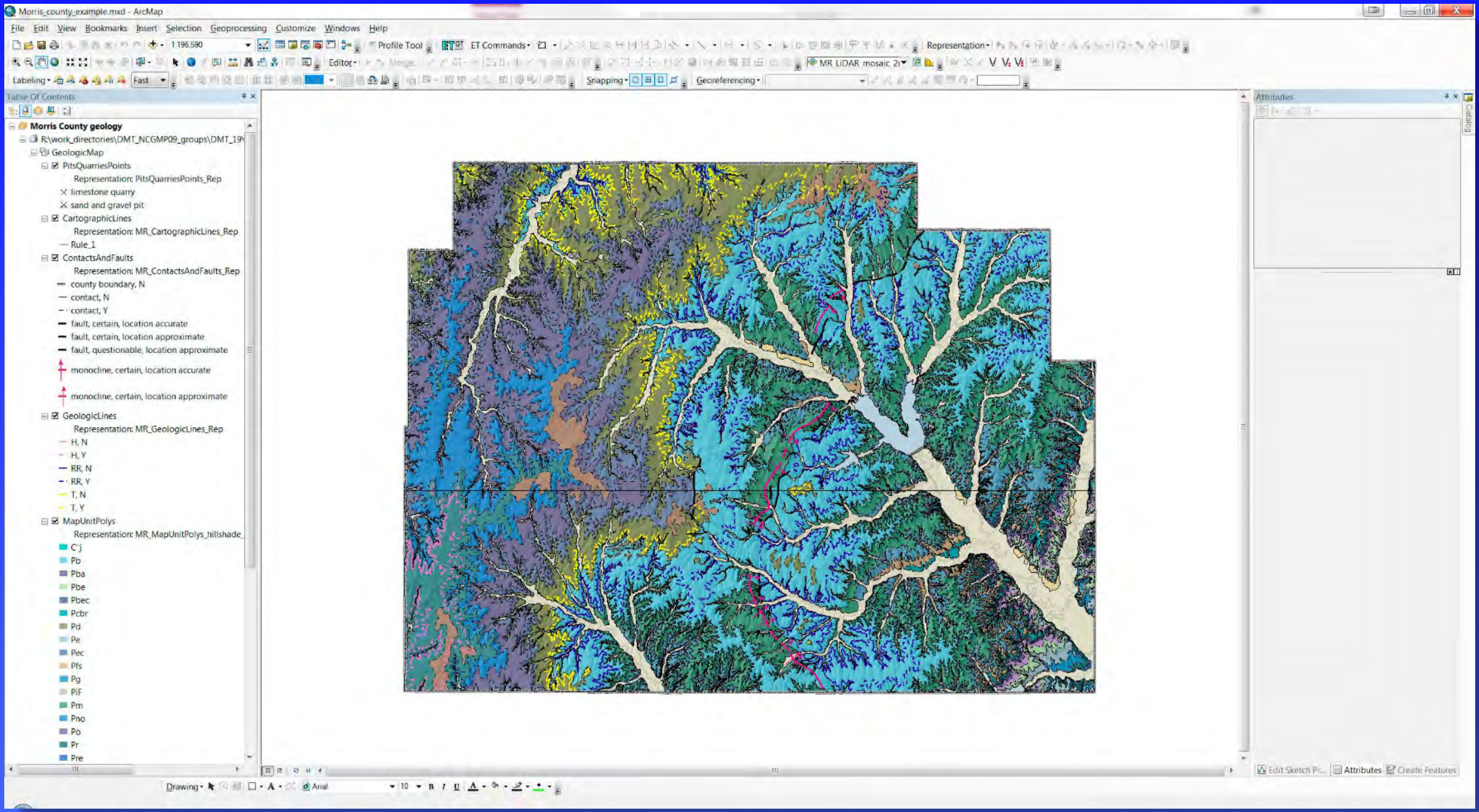
ArcGIS demo



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Summary

- In addition to its use for other goals, GeMS-formatted geologic maps/data are of great benefit to the end user:
  - In many cases, provides information not previously available;
  - Allows users to evaluate differences in data from map to map – no more "just trust us";
- In my case, it has also benefitted me by educating me about each map and its data as I assemble the NCGMP09/GeMS gdb.

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Questions?

demo\GE_MR_new\MR_geol_NCGMP09.gdb\DescriptionOfMapUnits

Contents | Preview | Description

OBJECTID *	Descripti	MapUnit	Label	Name	FullName	Age	Description
1	DMU01			Quaternary Deposits	Quaternary Deposits		
2	DMU02	Qal	Qal	Alluvium and terrace valley fill	Alluvium and terrace valley fill	Quaternary	Undifferentiated alluvium and terrace valley fill of the Neosh
3	DMU03	Qc	Qc	Colluvium and alluvial deposits	Colluvium and alluvial deposits	Quaternary	Extensive deposits of mixed colluvial aprons and alluvial fa
4	DMU04	Qpu	Qpu	Alluvial and eolian deposits (uplands)	Alluvial and eolian deposits (uplands)	Quaternary	Mixed alluvial and eolian (loess) deposits occurring on the
5	DMU05			Permian Units	Permian Units		
6	DMU06	Pwe	Pwe	Wellington Formation	Wellington Formation	Permian	The lower part of the Wellington Formation crops out along
7	DMU07	Pno	Pno	Nolans Limestone	Nolans Limestone	Permian	The Krider Limestone Member at the base of the Nolans L
8	DMU08	Po	Po	Odell Shale	Odell Shale	Permian	The Odell Shale is composed of silty, calcareous, nonfoss
9	DMU09	Pwi	Pwi	Winfield Limestone	Winfield Limestone	Permian	The Winfield Limestone crops out in the western third of th
10	DMU10	Pd	Pd	Doyle Shale	Doyle Shale	Permian	The lower Holmesville Shale Member is predominantly a g
11	DMU11	Pb	Pb	Barneston Limestone	Barnestone Limestone	Permian	The bottom member of the Barneston, the Florence Limes
12	DMU12	Pm	Pm	Matfield Shale	Matfield Shale	Permian	The lower Wymore Shale Member is a varicolored (gray, g
13	DMU13	Pw	Pw	Wreford Limestone	Wreford Limestone	Permian	The Threemile Limestone Member, the lowermost member
14	DMU14	Pfs	Pfs	Funston Limestone and Speiser Shale	Funston Limestone and Speiser Shale	Permian	The Funston Limestone is generally two limestones separ
15	DMU15	Pcbr	Pcbr	Crouse Limestone and Blue Rapids Shale	Crouse Limestone and Blue Rapids Shale	Permian	The Crouse Limestone is most easily recognized by the pl
16	DMU16	Pec	Pec	Easly Creek Shale	Easly Creek Shale	Permian	The dominantly olive-green to gray-green, silty, calcareous
17	DMU17	Pba	Pba	Bader Limestone	Bader Limestone	Permian	The Eiss Limestone Member, the lowermost member of th
18	DMU18	Ps	Ps	Stearns Shale	Stearns Shale	Permian	The Stearns Shale is a silty, calcareous, predominantly gr
19	DMU19	Pbe	Pbe	Beattie Limestone	Beattie Limestone	Permian	The lower member of the Beattie Limestone, the Cottonwo
20	DMU20	Pe	Pe	Eskridge Shale	Eskridge Shale	Permian	The Eskridge Shale is an argillaceous, calcareous, varicol
21	DMU21	Pg	Pg	Grenola Limestone	Grenola Limestone	Permian	The five members of the Grenola Limestone, in ascending
22	DMU22	Pr	Pr	Roca Shale	Roca Shale	Permian	The Roca Shale is a varicolored (tan-gray, tan-brown, gray
23	DMU23	Pre/IPre	Pre/IPre	Red Eagle Limestone	Red Eagle Limestone	Permian/Carboniferous	The three members of the Red Eagle Limestone, in ascen
24	DMU24	CPj	CPj	Johnson Shale	Johnson Shale	Carboniferous	Only the upper 6 ft (1.8 m) of the Johnson Shale is expose
25	DMU25			Other features	Other features		
26	DMU26	Pif	Pif	Pits fill	Pits fill		Pits fill
27	DMU27	Water	Water	Water	Water		Water