

DEFINITIONS of core data elements for maintaining the spatial representation of parcels
September 13, 2001 (8:30pm) MST

This list contains the data/metadata needed to maintain the geometry of parcels. Definitions of these terms are listed in *italic*. Graphic of data elements can be found in file mm-erd14d.dxf.

CORNER

Corner_ID

Same as in CDCS

Corner_Classification

Same as in CDCS

Subdivision_Quadrants_code

Describing the directions that a corner controls in section subdivision is an unimplemented technique that, along with Corner_Classification, supports section subdivision without dependency on rule-based Point IDs or of explicit coordinate geometry instructions.

A disadvantage of a rule-based Point ID system requires Point ID aliases between townships.

An advantage of rule-based system is that the number means something to data maintainers.

Any rule-based Point ID system can be generated from Corner_Classification and

Subdivision_Quadrants_code

The domain consists of any way to describe the aggregation of the appropriate combination of the controlling directions: NE, NW, SW, SE. This could be none, all or any combination, and is similar to CDCS's Placement, but provides a complete description of the purpose of the corner, where Placement is dependent on the parcel being described.

CDCS's Controlling is placed as attribute data to point being constructed, rather than on the parent point, which may have several child processes.

Subdivision_Quadrants_code can be used also to prevent further subdivision where records warrant this.

This field would not be needed if all coordinate geometry instructions for section subdivision are stored in the Coordinate_Value_Constructed table. This field would only be used for performing section subdivision using implicit rules of construction.

Corner_label

Same as in CDCS

Corner_qualifier

Same as in CDCS

COORDINATED LOCATION

This table compiles data on all points that are used

Coordinated_location_ID

Not always legal corner, but helpful in deriving most probable locations of Corner_IDs.

Corner_ID

Same as in CDCS, but not always legal corner. Corner_Point can be a tri-station or other feature that supports a geometric solution, in which case Corner_ID field will be null.

Set_by_Agent_ID

Same as CP-Source Agent in CDCS, but the name is a bit more descriptive for now.

Monument_type

Same as in CDCS

Monument_Date_Set

Same as in CDCS

Weighting_for_representative_corner

A representative corner coordinates can be an averaged from the coordinate value of several monuments that are candidates for the true corner (Corner). A representative corner provides a spot to draw the Record Boundary Line until a qualified person can make a determination as to which of the monuments is correct. More research and fieldwork may be required. The computed coordinate value can be averaged, but there may be reasons to give one of the monuments more weighting in the average. A weighting value of 1.0 will give all coordinate values equal weighting. "Averaging for representative corner" will have a construction method code and the resulting coordinates will have an entry in Coordinate Value.

Corner_Point_Status

Same as in CDCS

COORDINATE VALUE

Coordinate_value_ID

This represents a piece of data about the point.

Coordinated_location_ID

Not always legal corner, but helpful in deriving most probable locations of Corner_IDs.

X_Coordinate

Same as in CDCS

Y_Coordinate

Same as in CDCS

Z_Coordinate

Same as in CDCS

X_Accuracy

Same as in CDCS

Y_Accuracy

Same as in CDCS

Z_Accuracy

Same as in CDCS

Horizontal_Datum_Name

Name given to ellipsoid upon which geographic computations are conducted. NAD27 and NAD83 are common in the U.S.

Horiz._Coordinate_System_Definition

Name of the system that describes the mathematical surface, such as geographic (Latitude/Longitude) or any of a number of plane projections such as State Plane zones or Universal Transverse Mercator zones or locally defined projections. If the projection is local, then the parameters of the projection must be stored in a format not yet defined in this core data model.

Projection_Units

Same as Washington State DNR model Planar_Distance_Units, perhaps. State Plane Zones in NAD83 are defined with meter units. Many implementations convert those values to feet. Projection_Units specify which units are used in current coordinate values.

Adjustment_dataset_ID (see Adjustment Attributes, below)

Datasets not only describe the spatial footprint of the adjustment, but the purpose of the adjustment, ie. whether the adjustment was

– for analytical purposes ("technical adjustment")

– for aligning the land grid to legacy raster-based data ("cartographically aligned")

Date_Established

This indicates the time the coordinate is available for use. The Adjustment_Date in the Adjustment Attributes may always be this same date.

COORDINATE_VALUE_MEASURED (“Control”)

Coordinate_value_ID

Same as Corner Point ID, but not always legal corner. This represents a piece of data about the point.

X_Residual_from_last_technical_adjustment

Y_Residual_from_last_technical_adjustment

Z_Residual_from_last_technical_adjustment

These statistics on feature adjustment are useful in subsequent data analysis.

Source_ID

This ID points to a source document and is similar to C-Source Index in CDGS.

Source_ID_qualifier

This qualifier or suffix to the Source_ID can optionally be used to define subsets of data identified in Source_ID. It can provide additional data about a line, such as: tie-line, long chord, line to curve radius point, etc), but it is most useful when one source contains differing units of measure or when there are more than one value for any of the attributes listed in Source Attributes, below.

Capture_Methodology

Example values here are digitized-from-7½’-maps, GPS, digitized from legacy GIS theme, tri-station.

Station_Name_Published

Used primarily on published tri-stations.

Station_ID_Published

Used primarily on published tri-stations.

Coordinate Value Status

Same as in CDGS, but add to domain: “Use unadjusted value in adjusted dataset”

Used_in_technical_adjustment_flag

This flag also triggers whether point will be automatically used in next analytical/technical adjustment

Used_in_cartographically-aligned_adjustment_flag

This flag also triggers whether point will be automatically used in next carto-aligned adjustment

COORDINATE_VALUE_CONSTRUCTED

Coordinate_value_ID

Unique identifier for the coordinate value.

Construction_Method_code

This code explains which cogo method is used to create the point and therefore which set of arguments will be needed and where to find them. Also allow a code for “normal rule for section subdivision” as shorthand for rather elaborate processes.

Coordinate_value_ID_for_Construction

Starting point for primary line of construction. From here a direction from this point is defined from several options listed here as A, B, C, D. Whichever is the populated option determines which definition has been used. If all direction values are null and the distance option is used, then direction is to be determined through a distance-distance intersection. If neither a distance or direction is defined, then there is a data error.

Direction-A_fixed_value

Same as Direction Value in CDGS

Direction-A_quadrant

Same as Direction Quadrant, but can describe right/left and direction reference; from North or South.

Direction-A_unit

Same as Direction Unit in CDGS

Direction-A_type

Same as Direction Type in CDGS

Direction-B_to_Coordinate_Value_ID

Value would be the Coordinate_Value_ID to which the line points.

Direction-C_Parallel_From_ID
Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-C_Parallel_To_ID
Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-D_WtdMeanBrg-1_Fr_ID
Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-D_WtdMeanBrg-1_To_ID
Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-D_WtdMeanBrg-2_Fr_ID
Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-D_WtdMeanBrg-2_To_ID
Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Straight_or_Geodetic_flag
Is intersection to be determined along a straight line or along a geodetic line?

Distance_value_for_primary_line
Same as Distance Value in CDCS and is part of traverse or of distance-distance intersection

Distance_unit_for_primary_line
Same as Distance Unit in CDCS

Measured_line_ID
The primary line can be a line sequence which has a Measured_line_ID.

Trim_sequence_portion_to_Coordinate_Value_ID
Line sequences must overlap across the intersecting line so that intersection can be assured after adjustments. The segments of the line sequence to be trimmed are defined by the intersection Coordinate_Value_ID created by this intersection to the “Trim_sequence_portion_to_Coordinate_Value_ID” which can be the “Coordinate_Value_ID-From” or “Coordinate_Value_ID-To” defining the endpoints of the line sequence or to another intersection point created along the line sequence.

Distance_proportion
This is applied to distance from Coordinate_value_ID along line to Direction-B_to_Coordinate_Value_ID.

Coordinate_value_ID_for_secondary_line
Starting point for secondary line used in construction. From here a direction from this point is defined from several options listed here as A, B, C, D. Whichever is the populated option determines which definition has been used. If all direction values are null and the distance option is used, then direction is to be determined through a distance-distance intersection. If neither a distance or direction is defined, then there is a data error.

Direction-A_fixed_value_secondary_line
Same as Direction Value in CDCS

Direction-A_quadrant_secondary_line
Same as Direction Quadrant, but can describe right/left and direction reference; from North or South.

Direction-A_unit_secondary_line
Same as Direction Unit in CDCS

Direction-A_type_secondary_line
Same as Direction Type in CDCS

Direction-B_to_Coordinate_Value_ID_secondary_line
Value would be the Coordinate_Value_ID to which the line points.

Direction-C_Parallel_From_ID_secondary_line

Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-C_Parallel_To_ID_secondary_line

Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-D_WtdMeanBrg-1_Fr_ID_secondary_line

Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-D_WtdMeanBrg-1_To_ID_secondary_line

Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-D_WtdMeanBrg-2_Fr_ID_secondary_line

Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Direction-D_WtdMeanBrg-2_To_ID_secondary_line

Value would be the Coordinate_Value_ID that partially determines the direction by inverse.

Straight_or_Geodetic_flag_secondary_line

Is secondary line intersection to be determined along a straight line or along a geodetic line?

Distance_value_for_secondary_line

Same as Distance Value in CDCS and is part of traverse or of distance-distance intersection

Distance_units_for_secondary_line

Same as Distance Unit in CDCS

Measured_line_ID

The secondary line can be a line sequence which has a Measured_line_ID.

Trim_sequence_portion_to_Coordinate_Value_ID

Line sequences must overlap across the intersecting line so that intersection can be assured after adjustments. The segments of the line sequence to be trimmed are defined by the intersection Coordinate_Value_ID created by this intersection to the

Trim_sequence_portion_to_Coordinate_Value_ID which can be the From_Coordinate_Value_ID or To_Coordinate_Value_ID defining the endpoints of the line sequence or to another intersection point created along the line sequence.

Offset_distance_to_right

This is the offset distance to the right of the line defined from Coordinate_value_ID_for_Construction along line towards Direction-B_to_Coordinate_Value_ID. If the offset is to the left, use negative distance value.

Offset_units

Same as Distance Units in CDCS

Point_ID-1_defining_Bounding_Line_of_offset_line

See Diagram 1 below

Point_ID-2_defining_Bounding_Line_of_offset_line

See Diagram 1 below

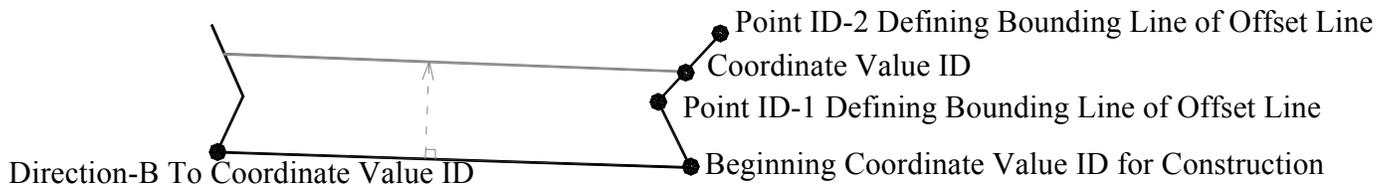


Diagram 1

Fixed_Acreage_Value

Some deed descriptions call for a fixed acreage to be removed from a whole piece of land. Example: "The South 6.00 acres of Lot 52". To solve this geometry correctly requires information about the direction of the dividing line. In the absence of this data the intention must be guessed.

ANGLE

An angle shows a relationship that a point has with two other points. An angle can reflect a measurement as reported on a deed or on a survey plat. An angle can also be a defined relationship, such as a point-on-line, which has an angle value of 180°.

Coordinated_location_ID-At

This represents a piece of data about the coordinated location.

Coordinated_location_ID-Backsight

The Coordinated_location_ID of the endpoint of the first line that defines the angle.

Coordinated_location_ID-Foresight

The Coordinate_location_ID of the endpoint of the second line that defines the angle.

Angle_value

Same as Angle in CDCS.

Source_ID

This ID points to a source document and is similar to Source Index in CDCS.

Source_ID_qualifier

This qualifier or suffix to the Source_ID can optionally be used to define subsets of data identified in Source_ID. It can provide additional data about a line, such as: tie-line, long chord, line to curve radius point, etc), but it is most useful when one source contains differing units of measure or when there are more than one value for any of the attributes listed in Source Attributes, below.

Point-On-Line_flag

This flag indicates that this point (at) is intended to be a point on the line between two other points (backsight and foresight). The angle value, by definition, is always 180°. Line coincidence can be derived by noting that the endpoints of a line are both "points on line" of the same longer, senior line. The senior line must be drawn through all the points defined for being on that line. Also the longer, senior line may not be represented in Line Measurement, such as the unsurveyed centerline of section.

Used_in_technical_adjustment_flag

Used_in_cartographically-aligned_adjustment_flag

RECORD BOUNDARY

Record_Boundary_ID

Same as in CDCS.

Record_Bounds

Same as in CDCS

Measured_Line_ID

System generated unique ID for a measurement of a line. The presence of this element here gives a tie to the parent line, if any, after the coordinate construction methods break the parent line into smaller segments. For example if a Measured_Line_ID references a line that measured North 2640 feet between monuments, but land is described in 10 acre units, the construction of those units involve splitting the line into two 1320 foot segments, then each of those are split into two 660 foot segments. The official bearing and distance of those lines is North 660 feet, yet the data structure at this point does not support the storage of these numbers. The Measured_Line_ID provides each of the four segments with the annotation of the parent line. In this scenario the subdivisional lines that have not been measured directly will not have an official bearing and distance as there is no parent line. At present the official bearing and distance of subdivisional lines have never been computed.

Record_Boundary_Legal_Status

Same as in CDCS

Record_Boundary_Comment

Same as in CDCS

Type_of_line

Domain is "Measured_straight_line", "Curved_line_circular", "Curved_line_spiral", "Offset_to_spiral_line", "Curved_median_line" and "Line_sequence". This field determines which tables to access.

LINE_MEASUREMENT

A measured straight line can be any vector that supports the analysis of the survey geometry. A straight chord of a curve can represent a curve in an adjustment, then the chord line is made invisible to subsequent operations.

Measured_Line_ID

System generated unique ID for a measurement of a line.

Coordinated_Location_ID_From

With Coordinated_Location_ID_To, identifies the line.

Coordinated_Location_ID_To

With Coordinated_Location_ID_From, identifies the line.

Distance_Value

Same as in CDCS, except that it applies to chords that connect the ends of circular and spiral curves. These chords can be used to constrain adjustments in least square analysis.

Direction_Value

Same as in CDCS, except that it applies to chords that connect the ends of circular and spiral curves. These chords can be used to constrain adjustments in least square analysis.

Distance_Residual_from_last_technical_adjustment

Direction_Residual_from_last_technical_adjustment

These statistics on feature adjustment are useful in subsequent data analysis.

Boundary_Defining_Flag

Same as in CDCS. This is also used for default annotation and is a input source for calculations determining proportionate values during automatic section subdivision.

Visibility_Flag

This is used to hide lines that are not boundaries or to prevent multiple depictions of a single measured line feature.

Source_ID

This ID points to a source document and is similar to RB-Source Index in CDCS.

Source_ID_qualifier

This qualifier or suffix to the Source_ID can optionally be used to define subsets of data identified in

Source_ID. It can provide additional data about a line, such as: tie-line, long chord, line to curve radius point, etc), but it is most useful when one source contains differing units of measure or when there are more than one value for any of the attributes listed in Source Attributes, below.

Used_in_technical_adjustment_flag

This flag also triggers whether point will be automatically used in next analytical/technical adjustment

Used_in_cartographically-aligned_adjustment_flag

This flag also triggers whether point will be automatically used in next analytical/technical adjustment

CURVED LINE CIRCULAR

Measured_Line_ID

Similar to Record_Boundary_ID in CDCS.

Radius

Same as in CDCS.

Radius_unit

Same as in CDCS.

Central_Angle

Same as in CDCS.

Angle_Format_Code

Same as Direction Units in CDCS, but should also define the format, ie DDMMS.SSS.

Direction

Same as in CDCS.

Degree_of_curve

Same as in CDCS.

Degree_format_code

Defines the format, ie DDMMS.SSS

Length_of_Curve

Same as in CDCS.

Type_of_Degree_of_Curve

Same as in CDCS.

CURVED LINE SPIRAL

Measured_Line_ID

Similar to Record_Boundary_ID in CDCS.

Spiral_length

Arc length of spiral curve or spiral curve segment

Curve_Radius_distance_begin

Radius of spiral at Coordinated_Location_ID_From. Value is infinite except in spiral curve segments.

Curve_Radius_unit_begin

Same as Distance Unit in CDCS

Curve_Degree_of_curvature_begin

Another way of stating Curve_Radius_begin

Curve_Degree_Format_Code_begin

Same as Direction Unit in CDCS

Curve_Radius_distance_end (could be infinite)

Radius of spiral at Coordinated_Location_ID_To. Value is infinite except in spiral curve segments.

Curve_Radius_unit_end

Same as Distance Unit in CDCS

Curve_Degree_of_curvature_end

Another way of stating Curve_Radius_begin.

Curve_Degree_Format_Code_end
Same as Direction Unit in CDCS

OFFSET_TO_SPIRAL_LINE

Note on Offset_Spiral_Line: The point identifiers from the feature of Line_Measurements pertain to the endpoints of the offset and the curve values from the feature of Curved_Line_Spiral pertain to the spiral centerline. [The offset to a spiral is not mathematically definable. It is not a spiral if it is parallel to the spiral centerline.]

Measured_Line_ID

Similar to Record_Boundary_ID in CDCS.

Coordinated_Location_ID_Centerline_From

The geometry of the spiral centerline, listed above, are applied to the endpoints of the spiral centerline.

Coordinated_Location_ID_Centerline_To

The geometry of the spiral centerline, listed above, are applied to the endpoints of the spiral centerline.

Offset_distance_value

The offset distance from the centerline.

Offset_distance_unit

Same as Distance Unit from CDCS

Offset_direction_code

The offset direction can be right or left. The offset direction value varies throughout the curve.

CURVED_MEDIAN_LINE

A curved line median is a parabolic curve that can be described with one line (directrix) and one point (focus), and the directions of lines going into and out of the focus..

Measured_Line_ID_Directrix

Similar to Record_Boundary_ID in CDCS.

Coordinated_Location_ID_Focus

The outside points defined by the directrix, together with the two lines associated with the focus, work together to define the curve.

Coordinated_Location_ID_Focus_BS

A line on the bank opposite from the directrix, formed between the Coordinated_Location_ID_Focus_BS and the Coordinated_Location_ID_Focus, is used to construct the median line.

Coordinated_Location_ID_Focus_FS

A line on the bank opposite the bank from the directrix, formed between the Coordinated_Location_ID_Focus and the Coordinated_Location_ID_Focus_FS, is used to construct the median line.

LINE_SEQUENCE

The purpose of the Line_sequence is provide a shorthand version of line data that are derived from GIS coverages or other map data. This data is not subject to adjustment and analysis, but is used where terrain features are called out as boundaries.

Measured_Line_ID

Similar to Record_Boundary_ID in CDCS.

Point_sequence

This is a sequence of coordinates between the From_Point_ID and the To_Point_ID. This could also be a sequence of point IDs whose coordinates are contained in a new category, 3.C.5 Corner_Point_Derived_from_Map_Line, but I think there should be a driving reason for assigning point IDs to these multitudes of points.

Line_sequence_source

Domain could be: digitized river or GIS-derived ridgeline or contour)

Coverage_source

This is some link to a map document or GIS coverage.

Error_circle_radius

This is a distance value from each coordinate within which the true value should fall 95% of the time.

Error_circle_radius_units

Same as Distance Units in CDCS.

SOURCE_ATTRIBUTES

This category contains source-level metadata that describes four kinds of measurements: control coordinates, distances, directions and angles.

Source_ID

This ID points to a source document and is similar to Source Index in CDCS.

Source_ID_qualifier (user-defined subset of source)

This qualifier or suffix to the Source_ID can optionally be used to define subsets of data identified in the Source_ID.

Source_document_title

Domain such as "mineral survey of MS1872", "melody acres subdivision, phase 132". This is much like Source Index from CDCS and may eventually be that.

Survey_Agent

Similar to Agent in CDCS, but more descriptive for now

Survey_date

Similar to Source Date in CDCS, but more descriptive for now

Measured_coordinate__horizontal_datum_name

Same as in Washington State DNR model. This is the native datum in which the coordinates are published.

Measured_coordinate__coordinate_system_definition

Same as in Washington State DNR model. This is the native coordinate system in which the coordinates are published.

Measured_coordinate__projection_unit

Same as Washington State DNR model Planar_Distance_Units, perhaps. State Plane Zones in NAD83 are defined with meter units. Many implementations convert those values to feet. Projection_Units specify which units are used in current coordinate values.

Measured_coordinate__vertical_datum_name

Same as in Washington State DNR model. This is the native datum in which the elevation is published.

Measured_coordinate__error_estimate

The distance amount that the horizontal coordinates are expected to be different than their true value. This estimate is indispensable in analyzing the geometry of the network.

Measured_coordinate__error_estimate_units

The units used in defining the error estimates.

Measured_line_straight-or-geodetic_flag

This flag marks a measured line as a planar (straight) line, such as a centerline of section and most private surveys or a geodetic (curved) line, such as a BLM/GLO section line. This flag is needed to define which kind of calculations are employed when calculating new coordinates on the line (proportion and intersection). This flag should work in conjunction with the straight-or-geodetic_flag in coordinate_value_constructed, which has the same purpose, but is most useful in defining constructed lines.

Recorded-measurement-or-vectorized-scan-of-plat_flag

This flag can help certify data to a higher or lower level of trustability.

Distance_unit

Same as in CDCS

Distance_type

Same as in CDCS

Distance_correction_constant

A known constant to apply to each distance in this set of measurements.

Distance_correction_ppm

A known multiplier to apply to each distance in this set of measurements.

Distance_error_estimate_constant

The constant amount which the distance is expected to be different from its true value. This value is indispensable in analyzing the geometry of the data. This protects good data from being overadjusted.

Distance_error_estimate_ppm

The ratio which the distance is expected to be different from its true value. This value is indispensable in analyzing the geometry of the data. This protects good data from being overadjusted.

Direction_quadrant

Same as in CDCS, but can describe right/left and direction reference; from North or South.

Direction_unit

Same as in CDCS

Direction_type

Same as in CDCS

Direction_correction

A known constant to apply to each distance in this set of measurements.

Direction_error_estimate

The amount which the direction is expected to be different from its true value. This value is indispensable in analyzing the geometry of the data.

Measured_angle_unit

Similar to Direction Units in CDCS

Measured_angle_error_estimate

The amount which the measured angle value is expected to be different from its true value. This value is indispensable in analyzing the geometry of the data. This protects good data from being overadjusted and has other utility like forcing points to be on a line

ADJUSTMENT_ATTRIBUTES

Adjustment_dataset_ID

This is the name of file or data table that was used to create the coordinate solutions.

Adjustment_type

Datasets not only describe the spatial footprint of the adjustment, but the purpose of the adjustment, ie. whether the adjustment was

- for analytical purposes or*
- for aligning the land grid to legacy raster-based data or*

Adjustment_date

Indication of currency of data

Adjusting_agent

Audit trail for

- quality assurance*
- support certification of data (was adjusting agent a registered land surveyor)*
- access to individual who knows what is going on with the data*

Standard-error-of-unit-weight_of_adjustment

This is a useful measure of how well the error estimates relate to the data quality.

Software_used

Brand, product, version.

POINT_ID_ALIASES

This table cross-references all system point identifiers with inhouse identifiers, like GCDB IDs.

Coordinated_Location_ID

Not always legal corner, but helpful in deriving most probable locations of Corner_IDs.

Region_Scheme

Named regions (datasets) that are the basis for the Inhouse ID scheme, like Township or grant.

Inhouse_ID

Reference to legacy IDs. This can be an agency's readable, rule-based IDs. Persisting these IDs is necessary to:

- provide ties to IDs printed or hand-written on paper documents during data collection.*
- support software that utilizes the rules in rule-based numbering, such as in section subdivision.*
- assist data editors in recognizing patterns in data.*

The Inhouse_ID is a numbering scheme associated with a named region like a township or grant so the full unique identification of the alias is the concatenation of Region_Scheme and Inhouse_ID.