New Mexico Parcel Mapping Manual
Version 2022.10
Technical Manual

Property Tax Division
New Mexico Taxation and Revenue Department

Revision
October 2022

DOCUMENT HISTORY

Version	Date	Author	Notes
2020	1/1/2021	Property Tax Division	Complete revision of 2001 mapping manual.
2022.10	10/25/2022	Property Tax Division	Revision to integrate addendums 2022.10.ParAdjCty and 2022.10.UPCPIE.

Preface

This revision of the New Mexico Parcel Mapping Manual is intended to align guidance from the Taxation and Revenue Department's (TRD) Property Tax Division (PTD) with current best mapping practices used in the State's thirty-three County Assessor Offices, State statute and regulations, and long term goals for PTD.

Since publication of the previous version of the New Mexico Mapping Manual, tax parcel mapping in the State's assessor offices has advanced and modernized dramatically. Through the leadership and vision of assessors and their mapping supervisors and technicians, New Mexico has experienced a significant transition from manual processes to automated mapping with property data, assessment analysis, and mapping workflows contained completely within computer software and databases. This updated manual is a product of the institutional knowledge, experience, and skill sets in assessor offices throughout the State including parcel mapping and appraisal database professionals.

The New Mexico Parcel Mapping Manual updates and replaces the 2001 New Mexico Mapping Manual. It is intentionally named the Parcel Mapping Manual to focus on tax parcel mapping. This revision has been divided into three parts; each part can be separately updated as needed to support evolving needs and trends.

> Parcel Mapping Policy Manual – This part of the Parcel Mapping Manual describes the strategies, architecture, and authorities governing the parcel mapping practices in New Mexico.

> Parcel Mapping Technical Manual – This part of the Parcel Mapping Manual describes the technical and production aspects of the parcel mapping practices in New Mexico. This component may be updated as needed with significant technical advances.

> Parcel Mapping Reference Materials - This part of the Parcel Mapping Manual provides references and resources to support New Mexico parcel mappers. This may be published as a web resource by PTD and could be updated as new information is available. The content could be guided by mapping official and assessor technical advisory groups.

Development, maintenance, and enhancement of a statewide digital real property parcel layer, as identified in both the "New Mexico Geospatial Strategic Plan, Phase 1" (August, 2007[1]) and the "New Mexico Parcel Data Business Plan" (March, 2009[2]), is an essential component of the State's geospatial framework data inventory. When each of the State's thirty-three assessor offices are able to fully implement the parcel data protocols and practices documented in this manual, it will expand New Mexico's ability to leverage this powerful and beneficial data product.

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[1] https://www.gac.state.nm.us/docs/NMGeospatialStategicPlan.pdf last accessed 12-3-2019

[2] realfile.tax.newmexico.gov/NMparceldatabizplan_final_04-03-09.pdf (download link) last accessed 5-15-2020

New Mexico Parcel Mapping Technical Manual

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1. Parcel Manual Objectives

The primary objectives for the Parcel Mapping Manual are as follows.

Policy Manual
>
> Document the statutory framework within which county assessor real property parcel mapping is expected to operate.
>
> Provide guidelines that inform parcel mapping operations to enable the production of consistent and professional county assessor information products that are easily interpreted and recognizable throughout the State.

Technical Manual
>
> Define the technical requirements that can be followed to build and maintain digital real property parcel data that is consistent in all thirty-three New Mexico county assessor offices.
>
> Define county assessor data publication standards that enable the integration of all thirty-three counties into one seamless and state-wide digital real property parcel coverage.

Reference Materials
>
> Identify and reference related cadastral standards to provide content and background for county assessors and parcel mappers.
>
> Provide educational and technology resources and guidance to support the development of information products.

The Parcel Mapping Manual and related data standard fulfills the statutory obligations of the Property Tax Division and informs county assessors and relevant staff of the parameters and practices that should be employed to meet the State's real property digital mapping requirements.

This revision of the 2001 New Mexico Mapping Manual is the result of a voluntary collaboration between the State of New Mexico Taxation and Revenue Department's Property Tax Division and a team of cadastral, mapping, survey, and GIS professionals representing a number of county assessor offices throughout the State. Although much of the content in the previous Manual is still relevant and highly regarded, the team recognized the need to "modernize" the document to align it with the current state of digital cadastral mapping. This edition of the New Mexico Parcel Mapping Manual is a product of the knowledge and subject domain expertise of the cadastral mapping and survey community at work in the State.

2.0 State Requirements for Parcel Mapping

New Mexico County Assessor Offices must submit their parcel mapping and property assessment data inventories each year to the Taxation and Revenue Department's Property Tax Division (PTD). The mapping data is integrated with assessment information to support State property tax practice analysis and to provide technical assistance to property mapping and appraisal personnel. The Parcel Mapping Policy Manual describes the authorities and benefits. The Parcel Mapping Technical Mapping provides specific guidance on parcel map data requirements for State submission as well as guidelines for assessor mapping processes.

2.1 Phases of Parcel Mapping

New Mexico has four levels of tax parcel mapping completion. The goal is to have all counties at the fourth level, but this will take time and is a progression.

1. No Polygons or Mapping in Progress – The UPC can be used to generate a point for the statewide data set, but the county does not have a maintained tax parcel polygon data set.
2. Tax Parcel Polygons – A polygon is established for every taxable record in the CAMA database. There may be alignment or accuracy issues, but there is a polygon or intended to be a polygon for every tax parcel.
3. Tax Parcel plus Publicly Owned Polygons – In addition to the taxable polygons the federal, non-taxable tribal, and State and locally owned parcels are included.
4. Complete Coverage – Highway rights-of-way and water are added at this level. Road rights of ways are "broken" or divided at administrative and PLSS Township boundaries. All the upland, which are non-water areas or land areas, are mapped at this level. Water bodies are included as needed to fill in the coverage providing a complete representation of the lands (and waters) in the county.

Each level is more complete than the previous one. These provide a natural progression of county parcel mapping which focuses on the revenue generating polygons first.

2.2 Parcel Mapping Attributes

Data Sharing Attributes

The PTD Business Modernization Project describes a core set of parcel attributes that are combined with the data in the assessment and tax records to create statewide assessment information. As a part of the statewide parcel data aggregation effort there are twelve core attributes for parcel polygons. The data normalization routines will extract these attributes as a function of PTD's annual statewide data aggregation. Counties do not need to change their data structure or attribute naming conventions to conform to this standard, but they should provide information on the attributes in the local data set that correspond to these attributes. The following schema is from the "Data Exchanges" provided for the PTD Business Modernization Project:

PROPERTY INFORMATION MODULE DATA EXCHANGES - PARCEL POLYGON
File Name: [COUNTYNAME]-MMDDYYYY
Format: .shp (shapefile), .mdb (personal geodatabase), or .gdb (file geodatabase)
Feature Types: Polygon or point

The parcel polygon layer represents parcel boundary geometry. It should, at minimum, contain the parcel boundaries and identifier(s) to associate with CAMA.

Field Name	Status	Type (Width)	Description
upc	Required	Text (50)	The local parcel number for the parcel record; UPC in New Mexico
mapid	Required	Text (50)	Secondary parcel identification number (Note this may be an RNum or owner number)
area	Recommended	Decimal (15,2)	Area of parcel (calculated by GIS)
perimeter	Recommended	Decimal (15,2)	Perimeter of parcel (calculated by GIS)
legaldesc	Recommended	Text (1000)	Legal description
subdivision	Recommended	Text (50)	Subdivision name
township	Recommended	Text (10)	Township of parcel location
townshipdir	Recommended	Text (10)	Township direction (N = north, S = south)
range	Recommended	Text (10)	Range of parcel location
rangedir	Recommended	Text (10)	Range direction (W = west, E = east)
section	Recommended	Text (10)	Section of parcel location
lastupdate	Required	Date	Last edit or update data in county data

Local Data Attributes

The local data are the production or locally published parcel data attributes. These are the attributes the county uses to produce and manage the local GIS. The data exchange with PTD will not include all the local attributes. If local attributes are provided, they will not be processed as part of the State data aggregation program.

Each parcel spatial feature (point at level 1 and polygon at other levels; see 2.1 above) should contain an equivalent of the following attributes. For attributes that are specified in the data exchange the field name and format have been specified. For a local data file, the file name and format can be what best fits the county production and editing functions.

1. UPC Code – This is a required field for the PTD data exchange. The form and format for the UPC code is included in Appendix A of this Manual. This attribute is required for state exchange and provides an identifier with a PLSS location point based on the relative location of a parcel point in a PLSS section.
2. STCNTYFIPS – These are added by the data extraction and transformation software. The Federal Information Processing System (FIPS) code for the state and the county the parcel is located within, concatenated into a 5 digit text field.
3. Property Tax District Identifier – This is required for the PTD data exchange and is either the local tax district identifier or the PTD tax district number. This should be identical to the property tax district in the related CAMA file. If the polygon (or point) does not have a related CAMA record, the property tax district in the polygon file is helpful for visualization. In the GIS, non-taxable parcels should have an assigned district. If this is not provided, it will be provided from the CAMA records.
4. Tax Status – taxable or non-taxable. The non-taxable can be expanded to include the type ownership that makes the parcel non-taxable. The suggested domains for the Tax Status are as follows. At a minimum taxable or non-taxable should be specified.
   - T – taxable
   - N – non-taxable
   - F – Federally owned Lands
   - I – International or Indian or Tribal Lands
   - S – State owned lands
   - C – County owned lands
   - L – Local Government owned lands
   - X – Exempt lands such as 501(c)3 or religious organization owned lands

- O – Other non-taxable lands or not classified lands
5. Local GIS Identifier - This is a local mapping polygon identifier. Some jurisdictions identify each polygon with a MapID or a global identifier or an object identifier.
6. CAMA identifier – This is required for the PTD data exchange and is the attribute that links the mapping to the CAMA records. Some counties use the RNum or OwnerID to link mapping to the tax records. If the County has a code different than the UPC for linking tax mapping features to the assessment records, then that identifier is included in this field. In some counties the non-taxable features may not have a record in the CAMA.
7. Date of Polygon Creation – This is an optional local field. This the date the polygon was originally created in the GIS. Many counties do not have this attribute but going forward it will be useful to know when the parcel record was created in the GIS.
8. Last Update –This is required for the PTD data exchange and is the last date the geometry or attributes for the parcel were revised or updated.
9. Mapping Agency – This is an optional local field. This is the department, agency that mapped the polygon and is assumed to be the county unless noted.
10. GIS computed Area in acres – This is an optional local field. The area field in a GIS can be used to compute a field for the GIS acres. This is helpful for analysing the accuracy of a legal description.
11. Legal Area – This is an optional local field. If provided in the legal source document, this is a data entry requirement unless it can be imported from the CAMA and is used to compare the acres in the legal document and the GIS acres. In the GIS it is helpful to convert the legally reported area into acres.
12. Source document for the mapped parcel – This is an optional local field. This is the deed or survey plat that was used as the source for the parcel geometry; the document that was used on the parcel creation date.
13. Geometry accuracy – This is an optional local field. This is indication of the parcel polygon placement and closure accuracy. For points this is an indication of the placement accuracy.
14. Legal Description – This is a required field for the PTD data exchange and may be used to support matching records. This field captures the "as written" or "as recorded" legal description that was used to map the parcel and can be helpful in identifying mapping issues and establishing the basis of the polygon geometry.
15. Standardized Legal Description – This is an optional local field. In many cases the recorded legal description is presented in a non-standardized format. The County may want to improve on the recorded legal description by standardizing the content based on the type of legal description. It is sometimes useful to break this standardized description into separate fields for PLSS Township, Section and Land Grant.
16. Parcel or site address – This is an optional local field. This is a location address that has been assigned by a county authority and is a site or physical address value that can be used for geocoding, record matching, or record verification. Many counties maintain address points as a separate point layer. If this is the case it is redundant to pull these into the parcel polygons.

Other attributes such as the current transaction document or owner name may be included in the mapping file. These may be especially important for mapping polygons that do not have a record in the CAMA database. In general, the State will rely on the CAMA record as the system of record for owner name, last transaction document, values, and property tax exemptions. The property tax district in the CAMA and the parcel mapping should be identical.

Condominium ownership parcels will include a related table with the UPC, Local CAMA ID for parent parcel, Local GIS Mapping ID, Local CAMA ID for unit parcel, and Condominium Unit number or identifier. This will

be a one-to-many table with one condominium mapping record having many records in the condominium related table. All condominium records should be in one table, i.e. not a separate table for each condominium.

2.3 Tax District Identifier

Each tax parcel will have one tax district identifier. This can be a local tax district code which will be converted to a statewide standard when the statewide data are compiled or the state standard tax district code, listed in the Appendix to this Manual.

New Mexico counties could use one of three approaches for ownership parcels crossing a tax district boundary. The preferred method is the first approach where the tax district splits the ownership parcel creating two tax parcels, using the UPC as an identifier for the ownership parcel. The second approach is not apparent in New Mexico. The third approach is used in many counties.

1. Ownership Parcel is split at the tax district boundary – In this approach the tax district line forms a "tax parcel split" line. Two tax parcels are generated and a key field, typically the UPC, is used to identify the ownership parcel so it can be reassembled into a single feature. A local MapID could also be used for this purpose. As shown in the sketch below The UPC is the same for both tax parcels but the tax district is different for the two polygons. Dissolving the GIS data on the UPC will recombine the Ownership Parcel. The UPC plus the tax district is a unique identifier. In this approach Each tax district will get the correct allocation of property taxes. There will be a separate CAMA record for each tax polygon.
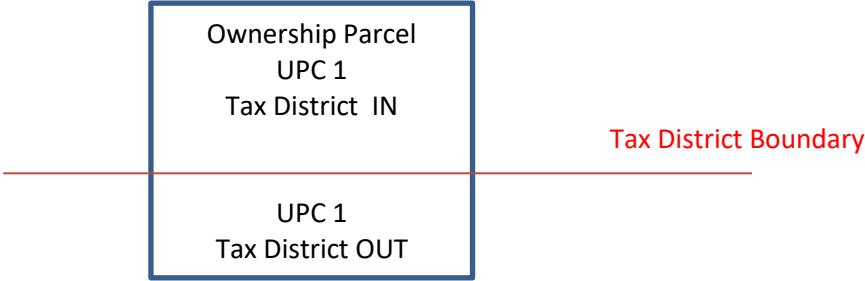
2. Value is proportionally assigned based on area – In this approach the ownership parcel remains as a single tax parcel, but the CAMA has two records. The tax district boundary is not used to split the ownership parcel and the tax district with the largest area is assigned to the parcel. In this case the second Tax District record exists in the CAMA records but not on the parcel map. Two tax records would be related to one mapped polygon. The treasurer or assessor are responsible for assigning the proportional values based on the percent of area in each tax district. Two tax bills could be created, or one tax bill could reflect the proportion of area in each district. The GIS data set assigns one tax district to the parcel.

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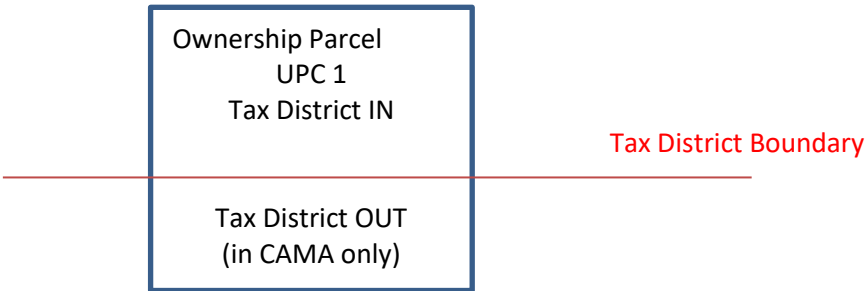
3. No proportional value and one tax parcel – In this case the CAMA record has one entry and the tax map has one tax polygon. The tax district splitting the ownership parcel is essentially ignored. No CAMA or tax records are created for the portion of the ownership parcel in the second tax district.
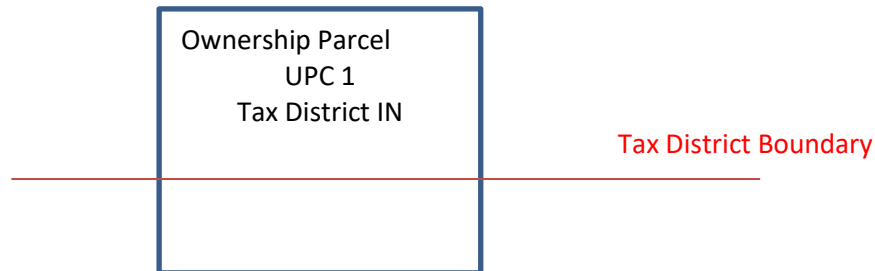
Some counties may use a mapping identifier or an ownership polygon identifier instead of the UPC as an approach to recombine the ownership parcel, if it is split by the tax parcel.

2.4 State Submission Frequency

The minimum frequency for State submissions is annually. Each county will provide PTD with an export of their mapping files. The county may choose to submit more frequently than annually. PTD will process updates when they are submitted. Backups will be maintained by PTD including an annual snapshot for historical tracking and analysis.

2.5 State Submission Format

The files will be provided in a single compressed file named with the county name or FIPS code and the tax year. If the submission is more frequent than annually the ending date should be included with file name. For example, if a county submits data quarterly than the date of the last day in the quarter should be appended to the file name.

PTD can accept the GIS or mapping formats used in New Mexico counties including geodatabase or shapefiles. The shapefiles will include all shapefile component files.
1. Parcel features (points or polygons)
2. Required attributes
3. Metadata text file

Each submission will have an accompanying metadata update report as a text file with the following items. The metadata record should be named the same as the submission file with a .txt extension. An example is included in Appendix C.

1. The tax year for the data file
2. Format of the map data submission (CAD, shapefile, geodatabase, geojsn, etc)
3. Name and version of mapping software
4. Level of parcel mapping included in the data set (1-5)
5. Last update date reflected in the data set
6. County contact for the parcel map data

7. Notes of any mapping format changes including file name and attribute field name changes from the prior submissions. If there are no changes in data structure since the last submission, then indicate no format changes.

The file content for the exchange file will be cross walked to this statewide format using an extract, translate, load (ETL) program.

Field Name	Status	Type (Width)	Description
upc	Required	Text (50)	The local parcel number for the parcel record; UPC in New Mexico
mapid	Required	Text (50)	Secondary parcel identification number (Note this may be an RNum or owner number)
area	Recommended	Decimal (15,2)	Area of parcel (calculated by GIS)
perimeter	Recommended	Decimal (15,2)	Perimeter of parcel (calculated by GIS)
legaldesc	Recommended	Text (1000)	Legal description
subdivision	Recommended	Text (50)	Subdivision name
township	Recommended	Text (10)	Township of parcel location
townshipdir	Recommended	Text (10)	Township direction (N = north, S = south)
range	Recommended	Text (10)	Range of parcel location
rangedir	Recommended	Text (10)	Range direction (W = west, E = east)
section	Recommended	Text (10)	Section of parcel location
lastupdate	Required	Date	Last edit or update data in county data

3.0 Parcel Data Land Descriptions

All parcels are geographically placed through a land description that defines the perimeter or the area of the land encompassed by the transaction. The land description provides the information to map and describe the area encompassed by the rights and interests in a deed or survey. There can be multiple land descriptions falling into multiple categories in one deed. These categories are as follows.

PLSS Rectangular Descriptions - This land description category is for the rectangular public land survey system and includes the PLSS Township and its rectangular divisions including sections, lots, government lots, quarter sections, sixteenths, and smaller divisions. In New Mexico, all areas without a surveyed rectangular PLSS are represented in an extended PLSS grid. This is not a surveyed or legally defined grid but is used for reference.

PLSS Non-Rectangular Descriptions - Non-rectangular PLSS land descriptions are termed Special Surveys and are surveys of pre-existing land claims or land rights established under special legislation or acts. Common examples are Tracts, which protect bona fide rights within the rectangular system and do not conform to an aliquot subdivision. Land Grants, Small Tract Act lands, Homestead Entries, and Mineral Surveys are common examples.

Survey Area and Nested Descriptions - Survey Areas are named areas that are established by survey and may or may not be divided into nested areas. Typically, these are a simultaneous creation of parcels. This means the survey simultaneously creates all of the parcels within its boundaries. Examples include: Subdivisions, Condominiums, Land Grants, and Townsites. Some of these land descriptions are subdivided into nested areas such as blocks and lots or claims and lodes. These descriptions may be within a Rectangular PLSS but do not have a rectangular PLSS description.

Strip Descriptions - A strip description is a linear alignment of specified width on each side of a described centerline such as a right of way. The terminal point and beginning point should be identified. The distances along the centerline with accompanying offset distances to the left and right are used to build the land description.

Perimeter Descriptions - The location and the delimited limits of land area may be defined by describing its boundaries; by naming natural or artificial monuments to, from, or along which they run; by stating the lengths and directions of the lines connecting successive corners and/or monuments; or by giving the boundaries of abutting lands areas. There are three subcategories of perimeter descriptions.

        Metes – A series of measurements typically bearings and distances around a polygon
        Bounds - A series of calls for either monuments or ownership of record around a polygon
        Metes and bounds – A combination of measures and calls, such as calls for monuments at the ends of lines, around a polygon.

Dependent Descriptions - Dependent land descriptions are categories that are less commonly used and typically depend on components of the other land description categories. These Land Descriptions require interpretation by a land surveyor and may need to be transformed into a metes description to be mapped. These descriptions include the following:

        Description by Proportional Area – such as the north half or a described area
        Description by Area – such as the west 30 acres
        Description by Division Line – such as those lands west of a named feature such as river or road
        Description by Distance – such as the easterly 40 feet
        Description by Exception – all those lands in Section 30 except those southeast of a river.

Description by Coordinates – These are descriptions of the land from the mathematical positions of corners. These are not common but must include the datum and projection system for the

Unresolved - These are land descriptions that cannot be resolved into a definitive area and need to be further analyzed to produce a manageable land description.

3.1 PLSS Rectangular Descriptions

The rectangular public land survey system is the PLSS Township and its rectangular divisions including sections, lots, government lots, quarter sections, sixteenths, and smaller divisions, shown in Figure 1.
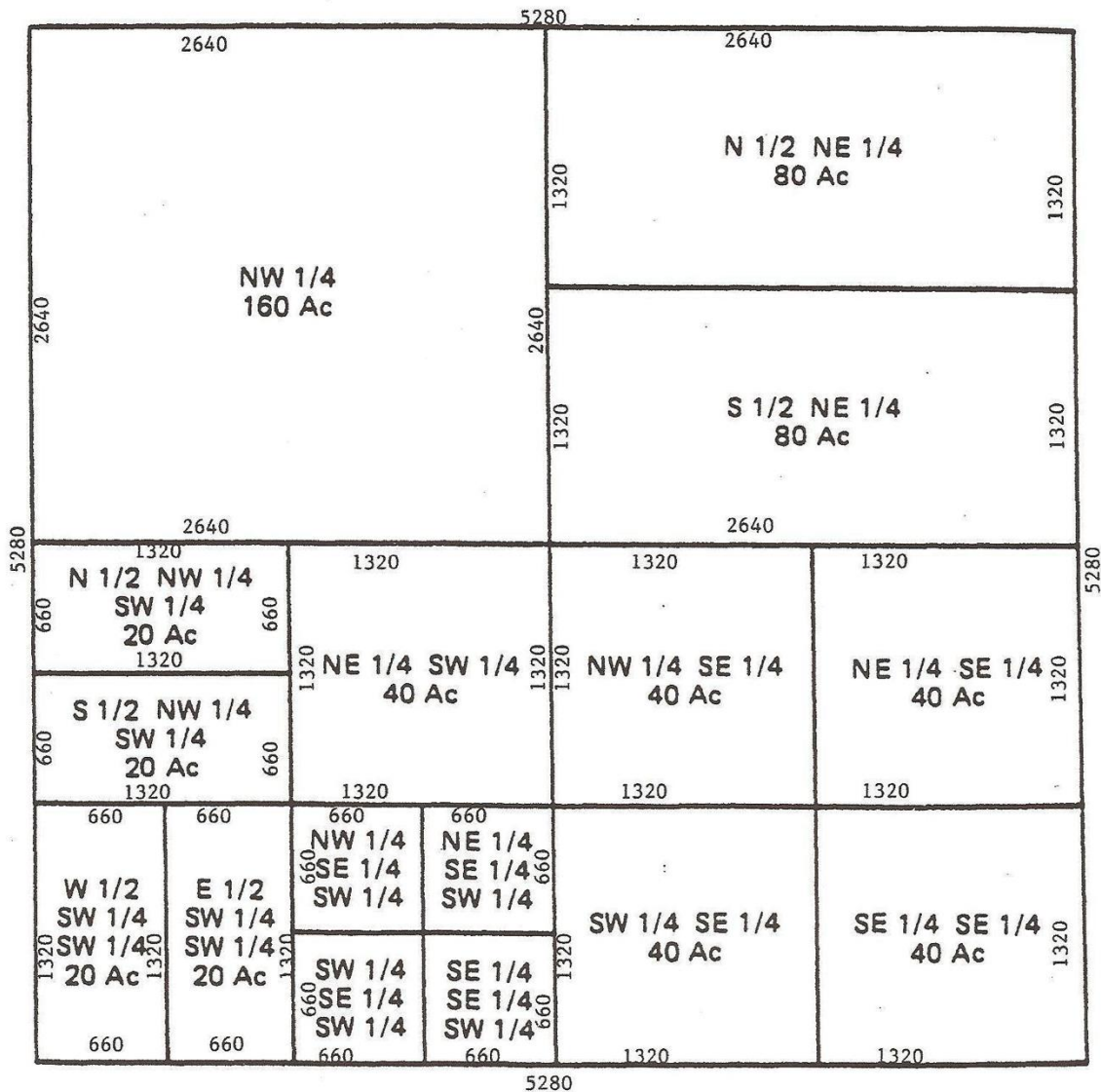

Figure 1 - PLSS Rectangular Descriptions

In Figure 1 the description of the subdivision of quarters does not use a comma in the writing of rectangular division descriptions. A comma means "AND THE" and the absence of a comma means "OF THE". The improper use or placement of a comma could drastically change a land description and the intended acreage to be described. Referring to Figure 1 NW1/4SE1/4SW1/4 absent of the comma describes an aliquot part of 10 acres. Placing a comma between the components such NE1/4, SW1/4, SE1/4 describes described three aliquot parts totaling 480 acres.

A complete rectangular land description includes the State, the Principal Meridian (a north-south line) and a Base Line (an east-west line) that pass through the Initial Point. In New Mexico the PLSS townships are referenced north or south from the Base Line and Range is referenced east or west from the Principal Meridian. PLSS Townships are nominally 6 miles by 6 miles. Townships contain 36 sections one (1) mile by

one (1) mile. These sections are then subdivided by aliquot methods for quarter and quarter-quarter for smaller aliquot divisions of the sections. Figure 2 is a parcel in Section 29, Township 30 North, Range 4 East, New Mexico Meridian.
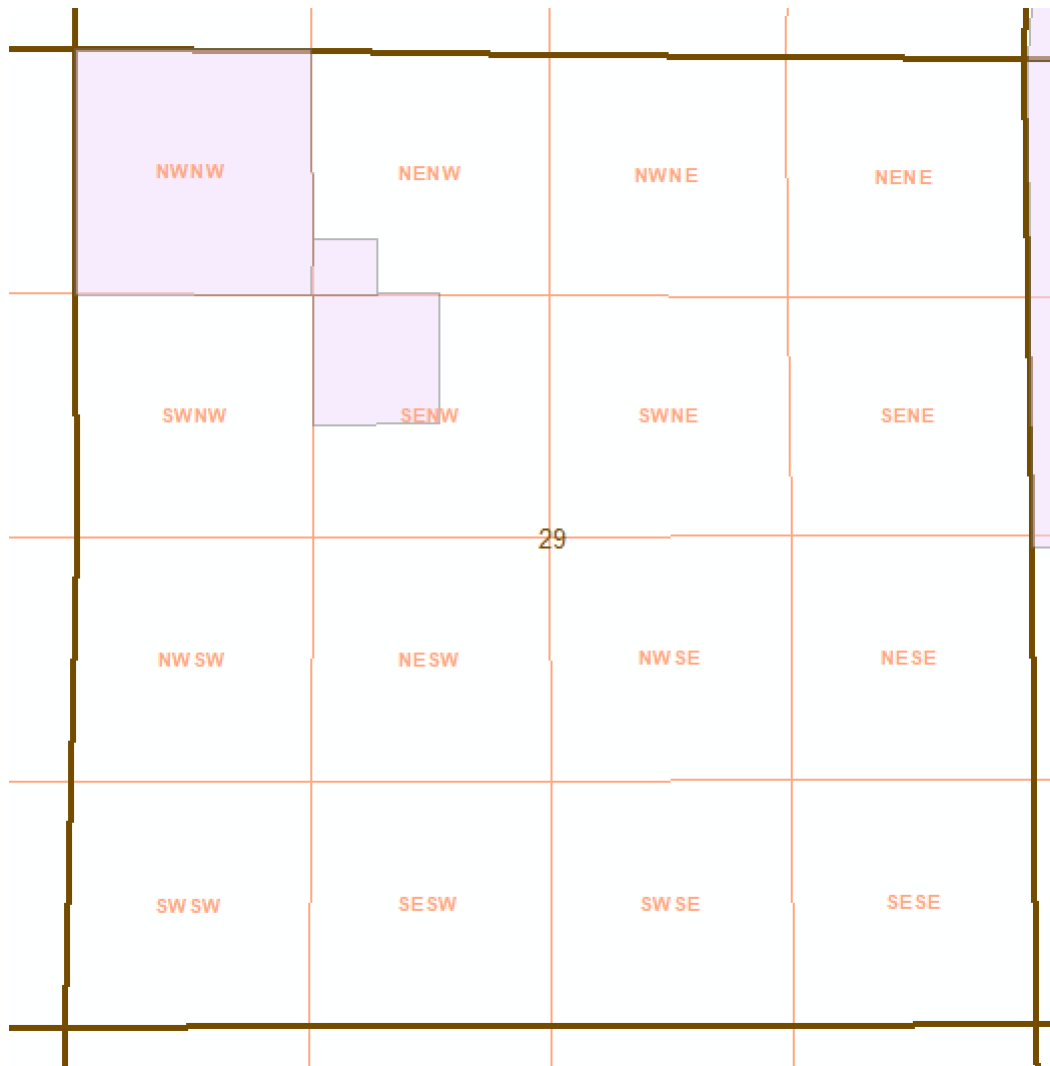

Figure 2 - Rectangular PLSS Parcel Example

The proper aliquot description will contain all of these referenced elements within it. For the parcel shown in Figure 2 there are three aliquot part components:

    the northwest quarter of the northwest quarter (40 acres) and
    the northwest quarter of the southeast quarter of the northwest quarter (10 acres) and
    the southwest quarter of the southwest quarter of the northeast quarter of the northwest quarter (2.5 acres).

    The correct written description for this area is:

NW1/4NW1/4, NW1/4SE1/4NW1/4, SW1/4SW1/4NE1/4NW1/4, sec 29, T30N, R4E, New Mexico Meridian, New Mexico containing 52.5 acres of land more or less.

The nominal acreages are used in rectangular descriptions unless a recent accurate survey has been performed on the ground to delineate these boundaries with more accurate acreages. The nominal aliquot acreages are used and could be "more or less" until determined by survey of the aliquot subdivision lines. When preparing multiple rectangular descriptions within a township, the preferred method is to create them in ascending order of sections. When they are within sections, the recommendation is to begin in the NE1/4 quarter, then counter-clockwise in order of the quarter-sections. Parcel mappers will likely receive descriptions in deeds that do not follow these rules. Some common checks for the parcel mapper are as follows.

- Does the described area and acreage closely match the area built from a nominal 640 acre section?
- Are the "AND THE" and "OF THE" components of the aliquot divisions producing a meaningful legal description?
- Are the aliquot parts built from the smallest division to the largest?
- Check for possible "typos" in the aliquot abbreviations.

"Lotting" may exist in the rectangular PLSS occurs within the PLSS Township and the lots, also called government lots, and is a component of the rectangular PLSS. Lots are the irregular or fractional portions of land within a section that are not regular rectangular parts. These are normally found along the north and west sections closing on a township boundary. They occur in most instances where a full sized or regularly shaped rectangular division cannot be performed. This can be due to completion surveys, elongated sections, fractionalized sections or segregation of special surveys (i. e. mineral, tracts, or homestead entry surveys). The description is the number of the lot within the section, the section, and the township, range and principal meridian references. For example:

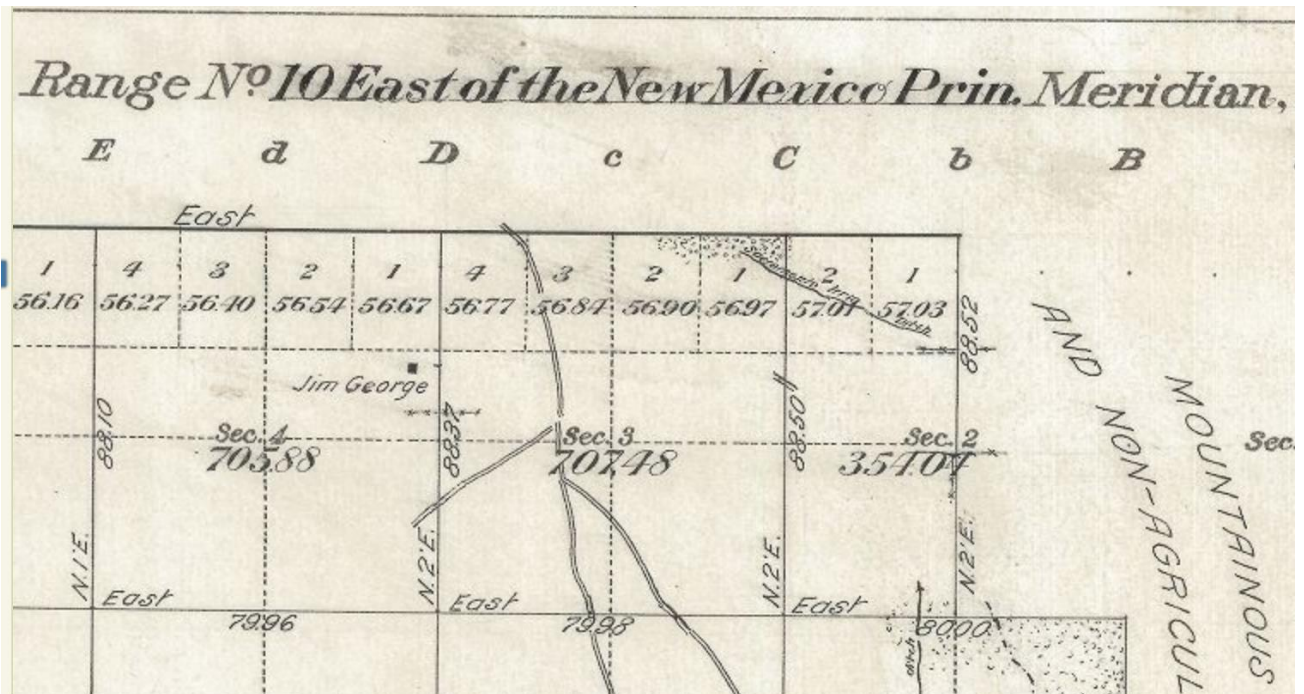Lot 2, sec. 3, T. 19 S., R. 10 E., NM PM., New Mexico shown below

Figure 3 - PLSS Rectangular Lots

Government lots or lots within the rectangular PLSS DO NOT have a corresponding rectangular description. For example, in the description in Figure 3, Lot 2 in Section 3 is _not_ also described as the northwest quarter of the northeast quarter. When the lot is established, it replaces the regular aliquot rectangular description. The number and placement of rectangular lots should be checked with the state of New Mexico CadNSDI data set. The government lot numbers can change with a new survey and the placement and numbering may not be as expected. For example, Figure 4 shows government lots in expected placement and numbering along a township boundary between T29NR9E and T29NR10E, New Mexico Meridian in Taos County.
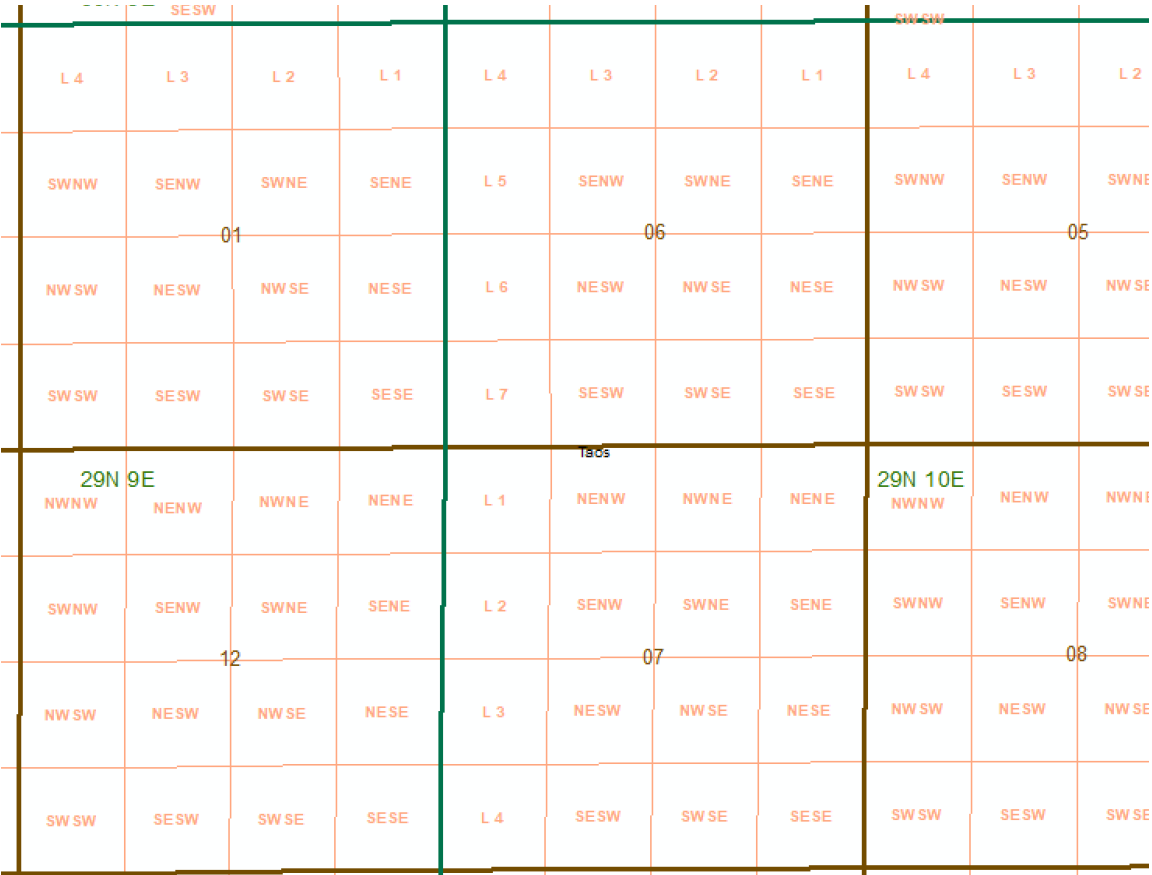

Figure 4 - Government Lots Expected Configuration and Numbering

In section 11 of T29NR9E an updated survey has identified an irregular area and government lots have been created in an interior section.
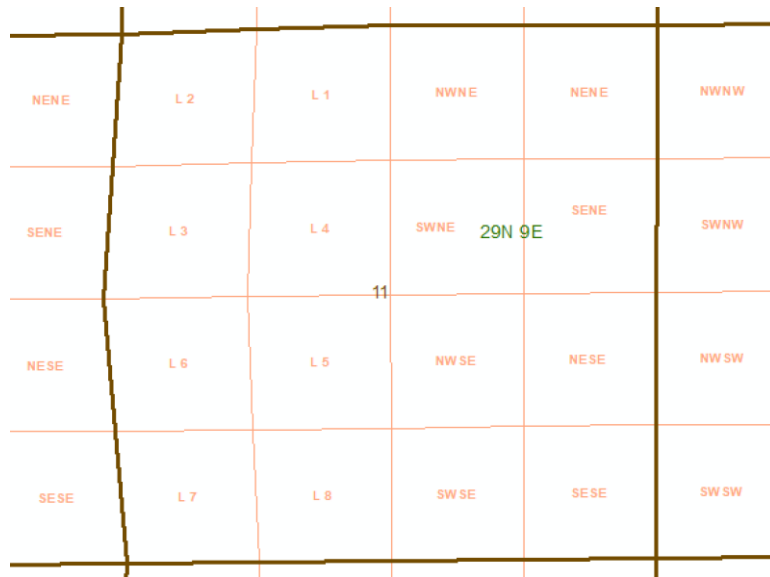

Figure 5 - Government Lots in Internal Sections

An example of government lots to segregate a special survey from the rectangular is shown in Figure 6. In this case the Homestead entry existed prior to the rectangular survey and the segregation lots identified as many regular divisions as needed to fill in the areas between the rectangular PLSS and the special surveys. Figure 6 below shows two homestead entries and one mineral survey.
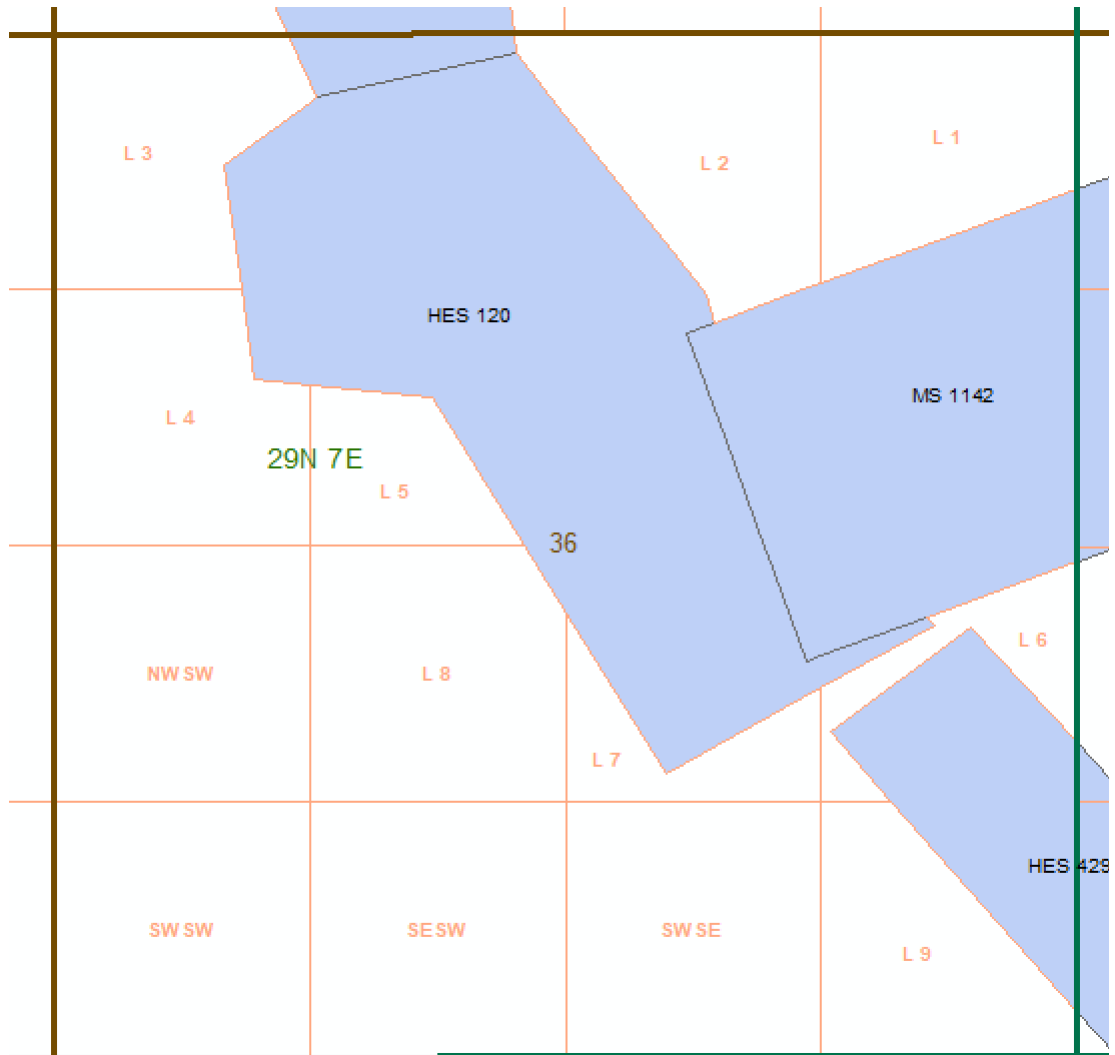

Figure 6 - Segregation Lots with Special Surveys

Recommended checks for the parcel mapper when working with government lots include the following:
- Legal descriptions on deeds may use the aliquot part descriptions instead of the correct government lot number. Verify if a government lot number should be included.
- Government lots should be indicated adjacent to special surveys and water, but not always. Verify government lots have been identified and validate their numbering.
- In some cases, a special survey will come after the rectangular survey has been established and there will not be segregation lots.
- The official government plats will identify the correct government lot numbers. If there are multiple lot numbers or stacked government lots in the CadNSDI, the plats should be consulted.
- Government lots will typically not be 40 acres. Check the legal description area against the reported government acreage.

3.2 PLSS Non Rectangular Descriptions

Non-rectangular PLSS descriptions are Special Surveys and are surveys that present themselves with unusual applications and/or a departure from the rectangular system. Common examples include tracts, which involve areas that do not conform to an aliquot subdivision, and mineral surveys.

Tracts - Tract surveys involve areas that do not conform to an aliquot subdivision and may lie in more than one township, section, or subdivision of a section. Tracts are generally created by metes and bounds to protect the bona fide rights of a patentee in the process of a resurvey of a previously surveyed or un-surveyed township. They are shown on an approved plat with accompanying field notes and are generally numbered beginning with thirty-seven (37) to prevent confusion with section numbers.
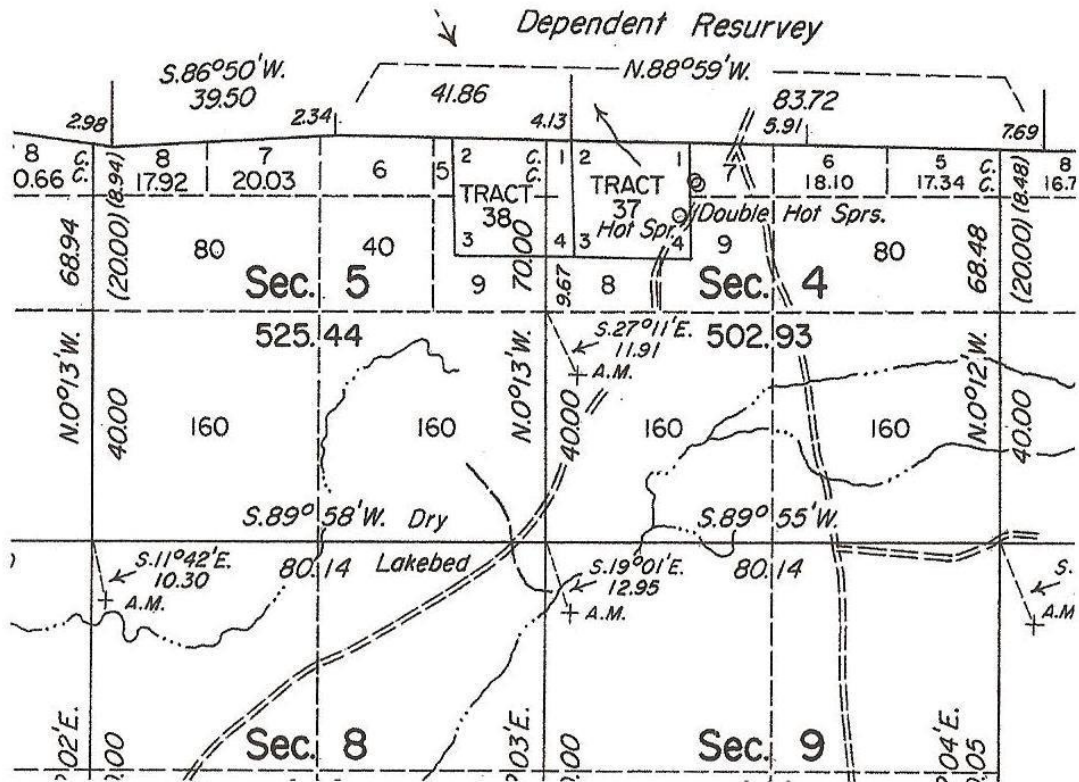
Figure 7 - PLSS Tracts

A proper land description for Tract 37 would be as follows:
Tract 37, T. 36 N., R. 26 E., M.D.M., Nevada

Tracts that span across two townships should be referenced to the township where the majority of the area of the tract falls. Figure 8 shows tracts in Grant County. Tracts can often cross section lines. The PLSS Rectangular aliquot parts will not extend into the tracts and the segregation lots should be identified.
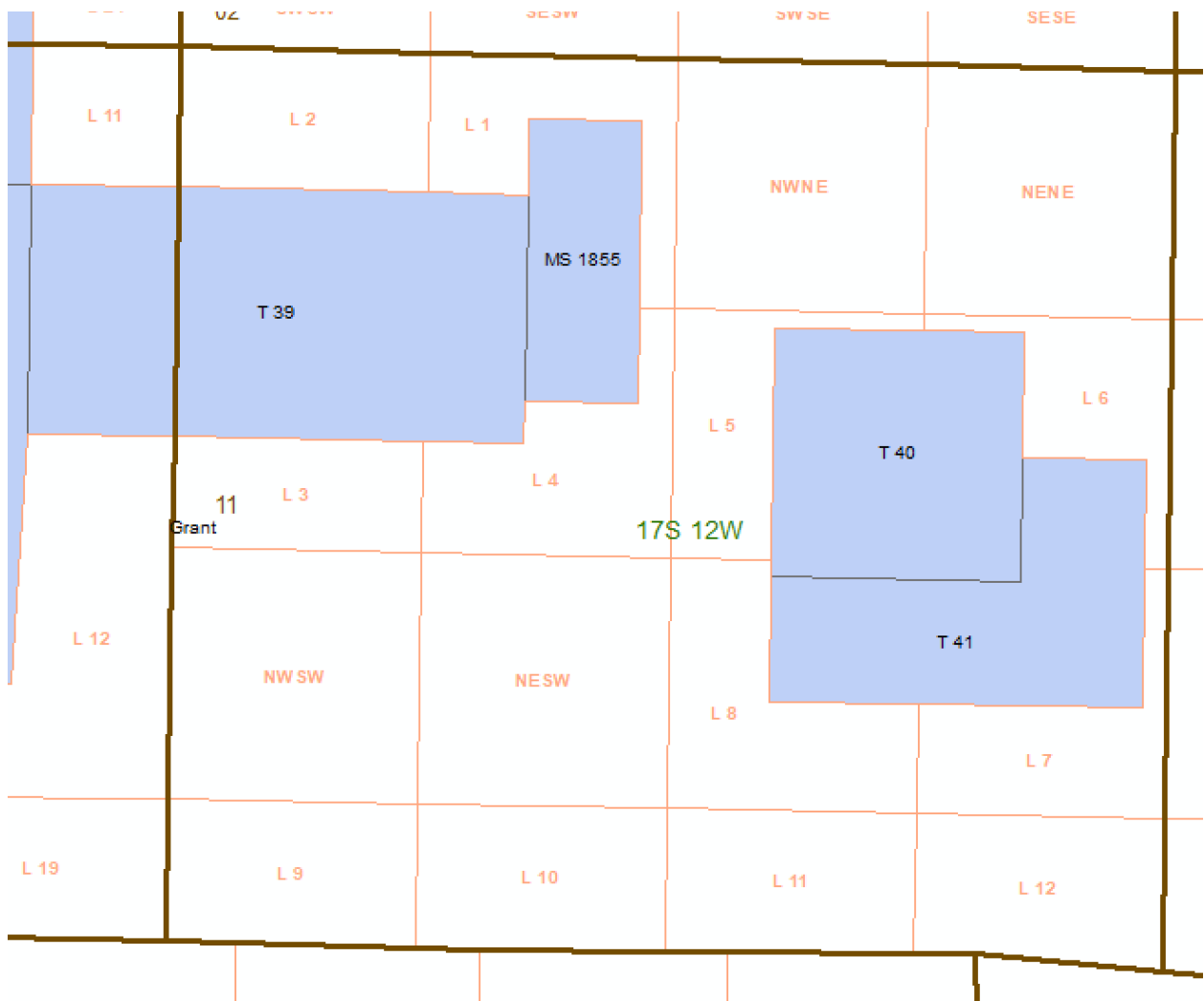
19

Figure 8 - Tracts in Grant County New Mexico

Mineral Surveys - In New Mexico mineral surveys are included in the PLSS Special Survey. The Bureau of Land Management (BLM) published a detailed text on the laws and procedures for mineral surveys in 1980[3]. Mineral claims and the laws and surveys associated with establishing, maintaining, and obtaining lands and rights on federal lands is a highly nuanced and involved component of federal land law. For the parcel mapper, the important elements begin once a patent, which is a federal quit claim deed, is issued. This passes the ownership from federal, i.e. non-taxable, to private, i.e. taxable, ownership. The BLM Energy and Minerals Division provides a summary of the types of claims and procedures on its web pages.[4]

Mineral surveys impact parcel mapping when they become the basis for land descriptions. In federal parlance a mineral survey is a metes and boundary survey identified by number that is unique within each mining district. For New Mexico, the mining survey numbers are unique statewide and are identified as MS with a number in the PLSS Special Survey feature class in the CadNSDI. Mineral surveys may contain multiple lode or placer claims and multiple mineral entries, such as mill sites. A complete analysis of the mineral survey requires an analysis of all the claims and entries in the survey and their transaction status, i.e. have

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[3] https://www.ntc.blm.gov/krc/uploads/538/Mineral_Survey_Pocedures_Guide.pdf (last accessed 4-1-2020)
[4] https://www.blm.gov/programs/energy-and-minerals/mining-and-minerals/locatable-minerals/mining-claims (last accessed 4-1-2020)

all of the claims and entries gone to patent and left federal ownership, what rights did the federal government reserve on the patent, and what are junior and senior rights among the claims.

In general, the parcel mapper should rely on the BLM Mineral Surveyor analysis and results as reported in the CadNSDI or on file at the BLM State office. The parcel mapper will encounter mineral surveys when they are used as a land description. In most cases this will imply that all of the lands in that mineral survey have passed out of federal ownership through a patent or federal quit claim deed, and the survey is then used as the legal description of the property.

Mineral surveys may or may not have an associated rectangular PLSS. If the claims and subsequent surveys were completed prior to the rectangular survey, the mineral survey will be a "hole" in the rectangular PLSS as it was a prior existing right. In other cases, the rectangular PLSS was completed and the mineral survey is "on top of" the rectangular PLSS.

In all cases the New Mexico UPC PLSS Reference will have a section area defined that can be used to generate the State UPC for parcels on the mineral survey.

Homestead Entry Surveys - A Homestead Entry Survey is a survey of a Homestead claim made under the Act of June 11, 1906, as amended (34 Stat. 233). These claims "were generally nonrectangular, without regard to the lines of the public surveys." The surveys were often made by employees of the Forest Service under special instructions issued by the General Land Office (now BLM). The PLSS Rectangular data will typically have segregation lots around the HES.
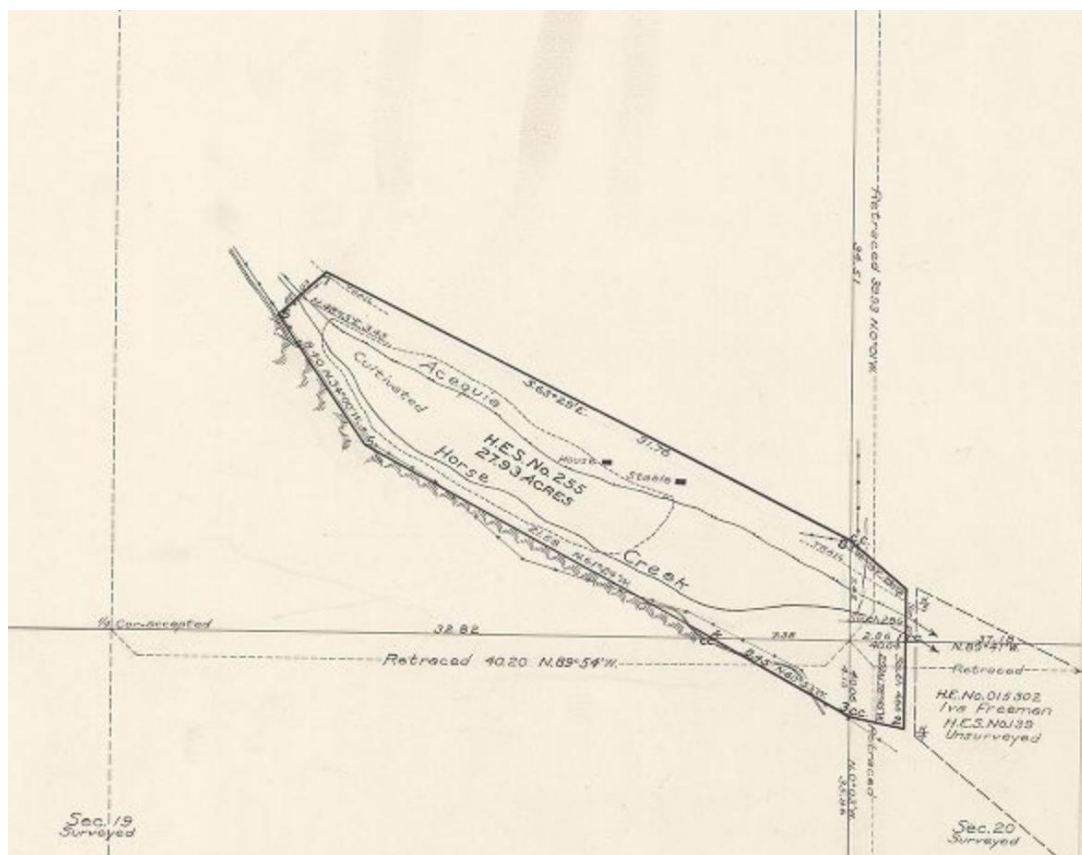
Figure 9 - Homestead Entry Survey Example in New Mexico

In Figure 10 below, this same area from the New Mexico PLSS data, the segregation lots around the Homestead entry are numbered. The full aliquot part divisions are also identified. However, not all Homestead entries will have segregation lots.

Figure 10 - Homestead Entry in CadNSDI

Homestead entries are numbered at the State level and will have a unique number statewide.

Parcels often reference or are contained within an HES. In Figure 11 the parcel data shown in gray with a block outline appears to mirror the HES but is slightly offset. This could be a positioning error in PLSS data or the county data and should be investigated.
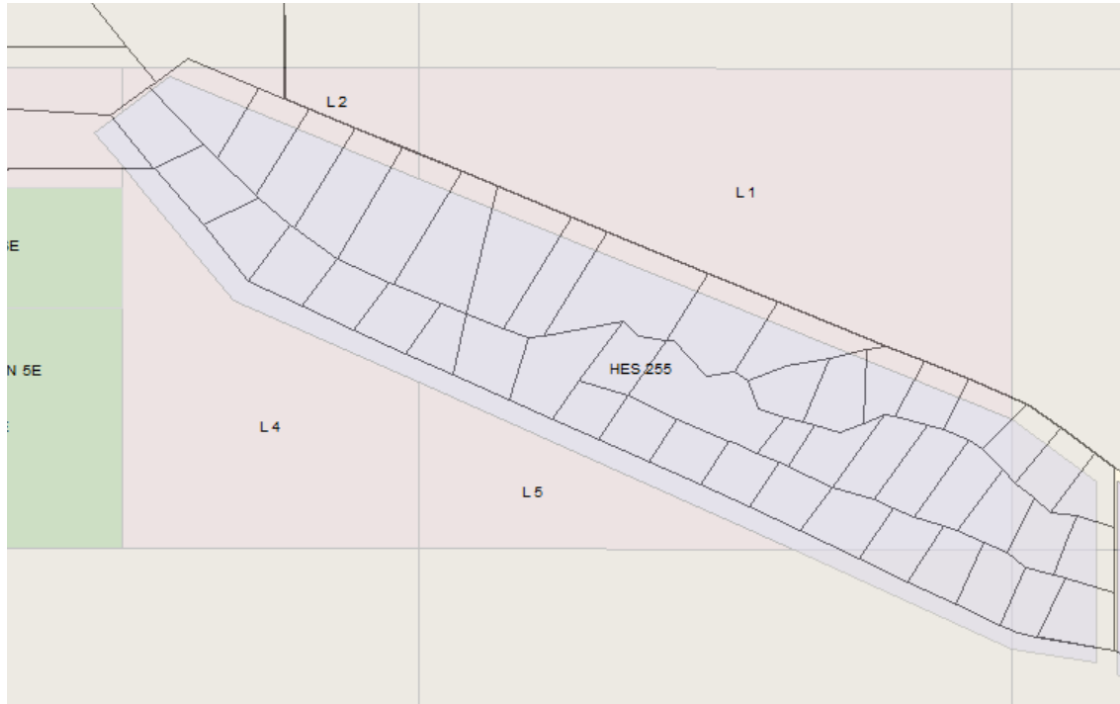
Figure 11 - Homestead Entry with Parcels

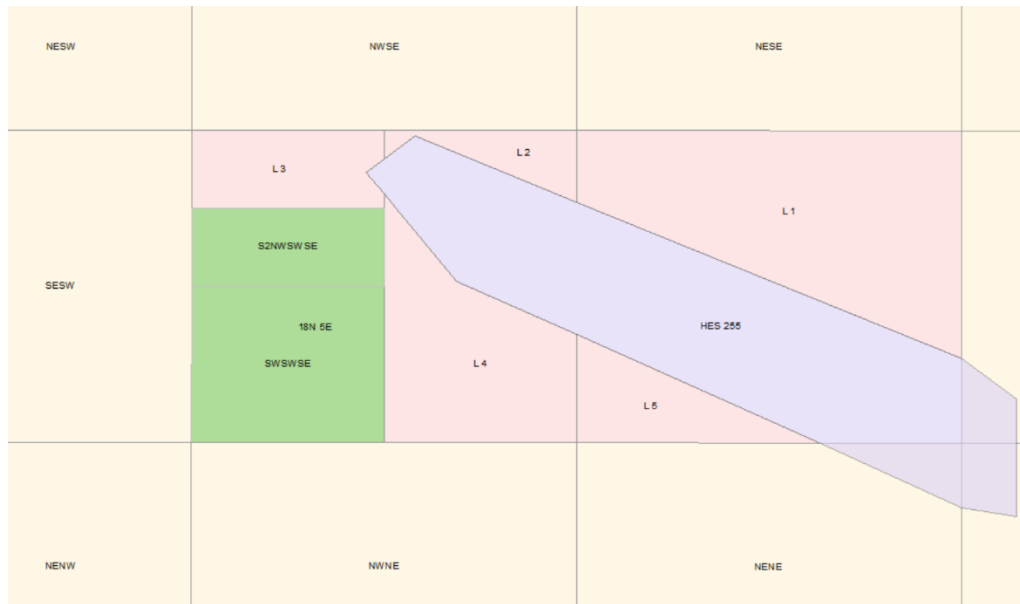*Small Tract Surveys* – In New Mexico these are land areas described by metes and bounds that were transferred out of federal ownership. In the Small Tracts Act these areas were generally under five acres. The Small Holding Claims are combined with the Small Tracts as Special Survey Type J in the BLM PLSS CadNSDI. However the New Mexico PLSS has areas identified as small tracts, shown in Figure 12, that are quite a bit larger than five acres and are defined as, "an entry in connection with which the entry man and his predecessors-in interest maintained continuous, adverse, actual, bona fide possession of public lands in the Southwest for at least 20 years prior to cadastral survey of the lands involved (acts of March 3, 1891, 26 Stat. 861; and June 15, 1922, 42 Stat. 650)." These areas typically will not have an underlying rectangular PLSS area and may or may not define parcel boundaries.
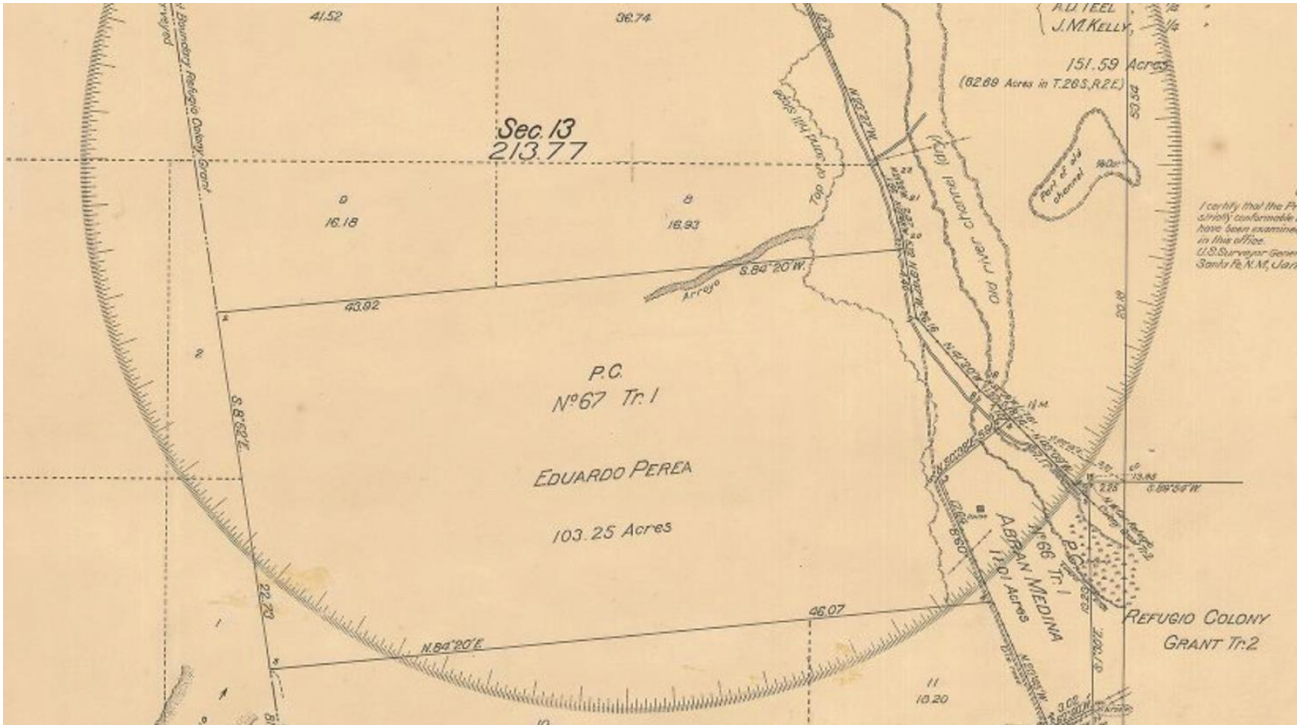
Figure 12 - New Mexico Small Tracts
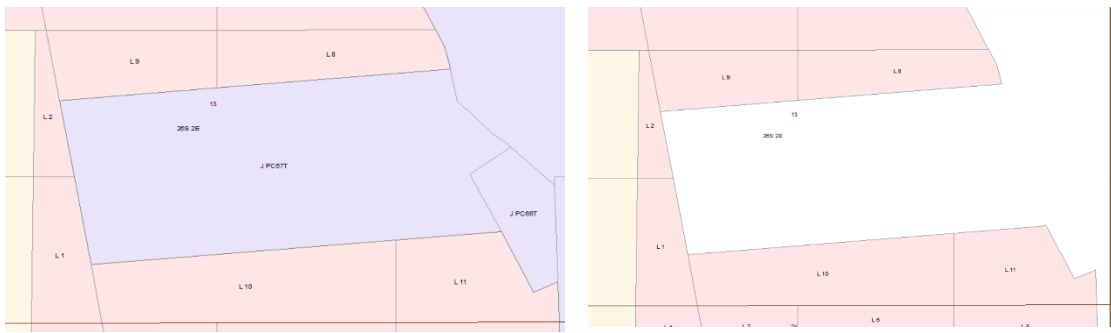
Figure 13 - Small Tracts in CadNSDI

Figure 13 left panel shows the small tracts in the New Mexico CadNSDI. The right panel is the same area illustrating the underlying rectangular is not extended under the small tracts, although the New Mexico extended PLSS may be shown in this area.

For this area the parcels coincide with the small tracts as shown in Figure 14, but this is not always the case. After these areas leave federal ownership the land descriptions for parcels may be based on other survey information.
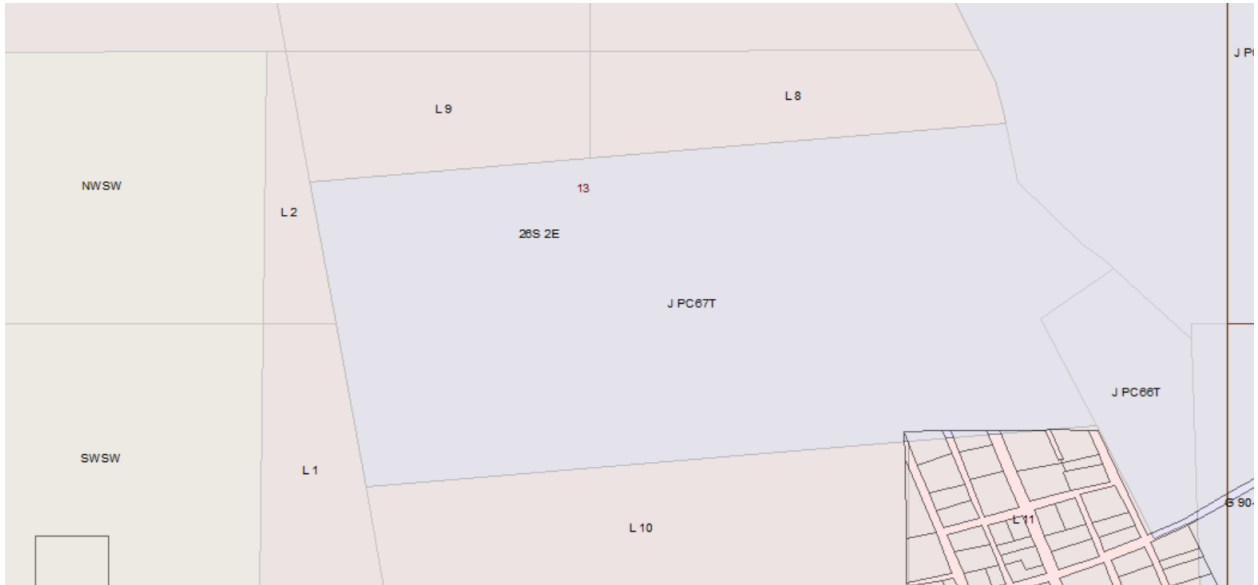
Figure 14 - Small Tract with Parcels

Land Grants – Land Grants have several definitions. In the original definitions a grant was land reserved by a foreign government at the time of U.S. acquisition. These lands became a part of the U.S., but the foreign entity retained ownership. A more encompassing use of the term refers to any lands where title has been confirmed or conferred from the United States for a particular reason or purpose. Grants were often transferred out of the public lands to states or other interests. The PLSS rectangular areas are not defined under the Land Grants. Some related terms that may be used for Land Grants are: (1) A quantity grant is a grant which the Congress specifies only the number of acres or the general type of public lands which are granted and which the grantee will secure by making selections from available public land, (2) A grant in place is a grant in which Congress specifically states, or implies, the legal description of the public lands which are granted, (3) Place lands which are lands granted in aid of a railroad company which are within certain limits on each side of the road, and which became instantly fixed by the adoption of the centerline of the railroad, or (4) Alternate lands granted to states under the public land laws when granted lands were unavailable.

There are lands granted to the states for schools under the Land Ordinance Act of May 20, 1785, modified in 1850. These are the lands included in a grant in place, or a grant in praesenti, to a state in support of common schools. In New Mexico and Utah these are PLSS sections 2, 16, 32 and 36. Typically the school grants are not shown as land grants in the PLSS data as they are based on the rectangular land descriptions and are subsequently granted out to states.
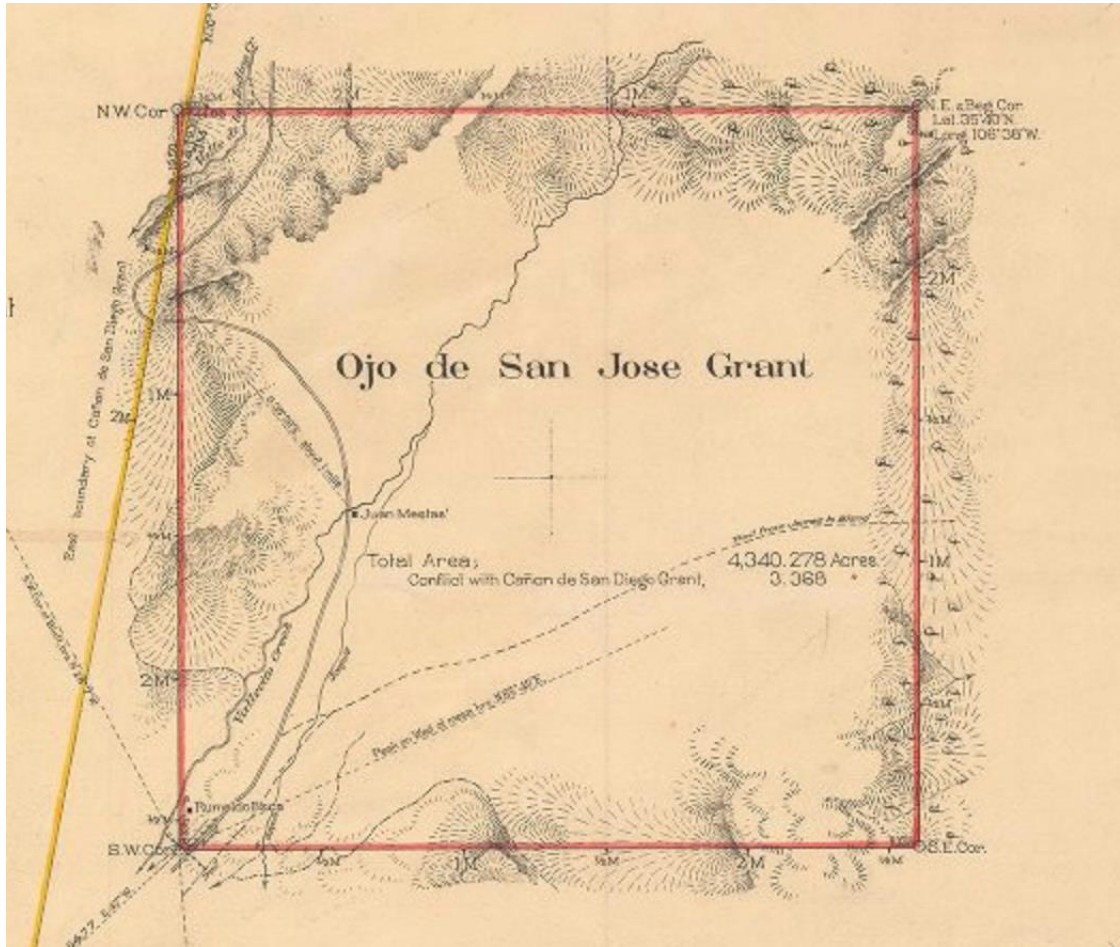
Figure 15 - Land Grant in New Mexico
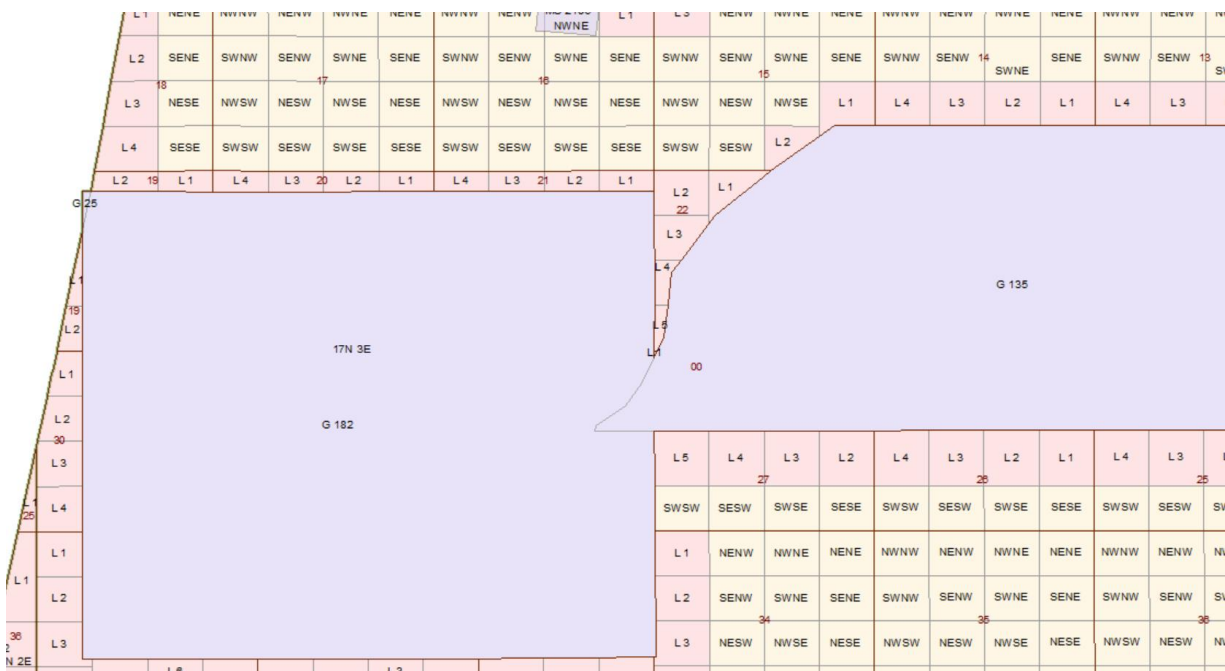
Figure 16 - Land Grant in CadNSDI

Parcels and land grants can be a confusing relationship. Figure 17 illustrates the parcels and the land grant shown in Figure 16. Parcels contained entirely within the grant will use the New Mexico extended PLSS to identify their UPC.
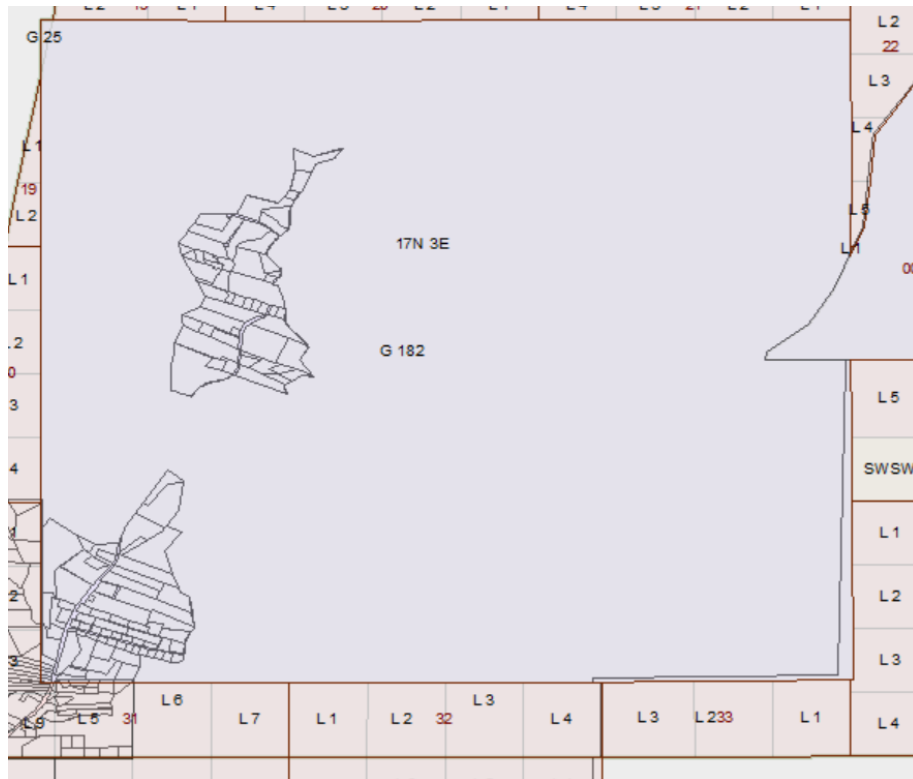
Figure 17 - Parcels and Land Grants

The detail in the lower left corner of the land grant shows parcels crossing the grant boundary.
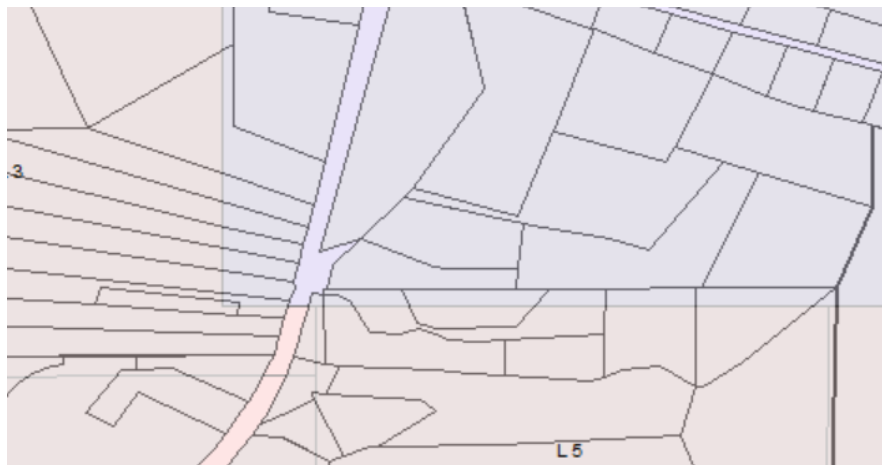
Figure 18 - Parcels and Land Grant Detail

When parcels are in the vicinity of land grants, the relationship to the grant boundary should be understood.

Townsites – There are nine townsite surveys in New Mexico. From the BLM Manual of Surveying, "A townsite survey, in public land surveying practice, is a survey made within one or more regular units of the township subdivision by which the land is divided into blocks, lots, streets, alleys, rights of way, and reservations as a basis for the disposal of title in village or town lots."

Cedarvale Townsite in Torrance County is one example of a townsite survey.
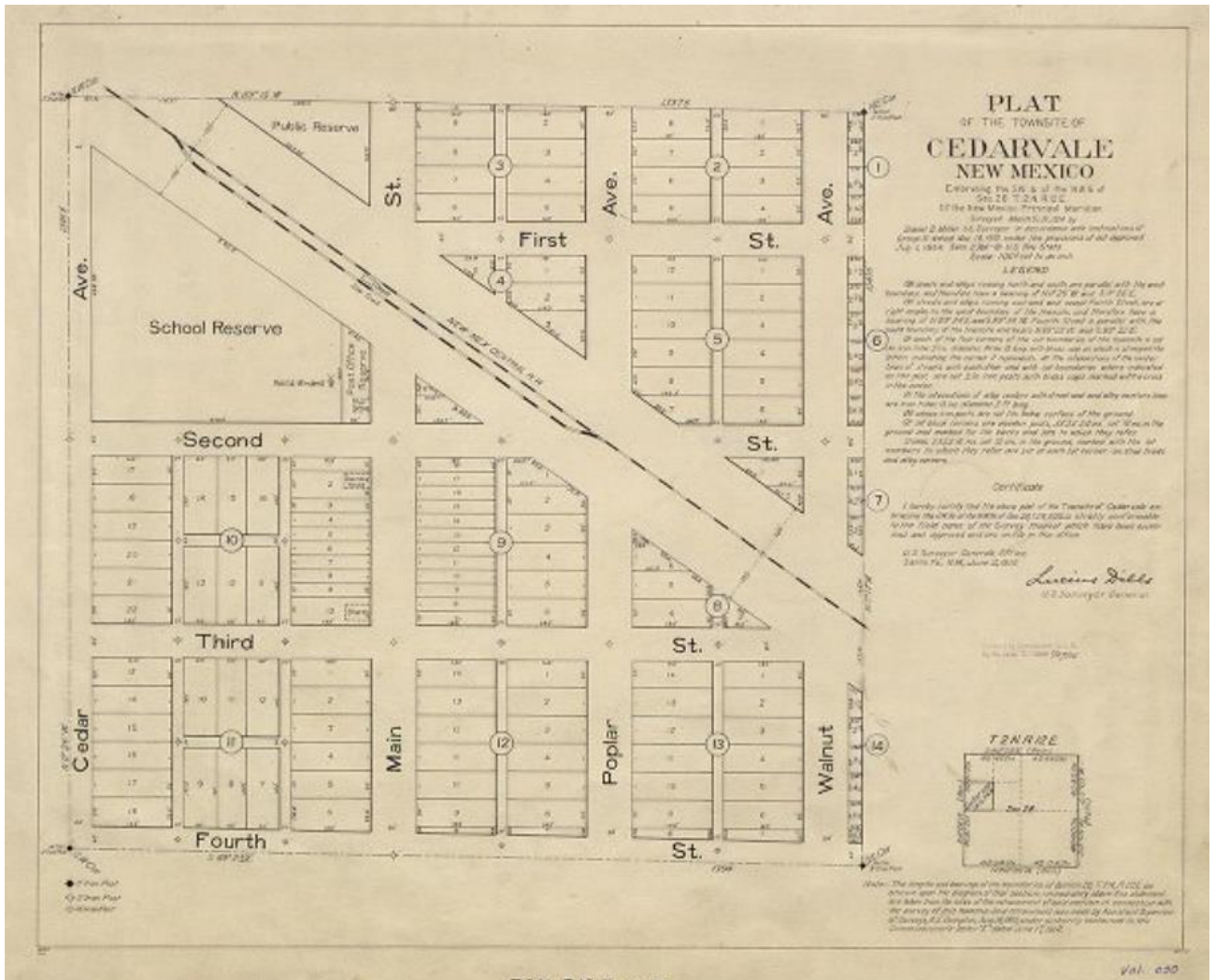
Figure 19 - New Mexico Townsite Plat

Townsites should be captured the same as a subdivision survey. Some of the lots may remain in federal ownership.

3.3 Survey Area and Nested Descriptions

Survey Areas are named or identified polygons that are established by survey and may or may not be divided into nested areas. Technically these are called simultaneous creation of parcels, which means the survey simultaneously creates all of the parcels within its boundaries. Examples include land grants, townsites and U.S. surveys. Some of these land descriptions are divided into nested or hierarchical parts such as blocks and lots or claims and lodes.

Simultaneous land descriptions occur when several parcels are created at the same moment. These are also called simultaneous conveyances. Examples are lots in a townsite, units in a condominium, or plots in a cemetery. A simultaneously created boundary results in several parcels of land created in the same legal instant by the same person, persons, or agency and by the same instrument. All parcels have equal standard and no such portion can be said to have prior rights or seniority over any other portion (Brown, et al. 1995).

3.4 Strip Descriptions

A strip description is a linear alignment or area of specified width on each side of a described centerline such as a right of way. In such a case the terminal point as well as the beginning point should be fully identified. The distances along the centerline with accompanying offset distances to the left and right are used to build the land description. The distances left and right are presumed to be perpendicular to the centerline.

3.5 Perimeter Descriptions

The location and the delimited limits of land or marine area may be defined by describing its boundaries; by naming natural or artificial monuments to, from, or along which they run, by stating the lengths and directions of the lines connecting successive corners and/or monuments, or by giving the boundaries of abutting lands or marine areas.

There are three subcategories of perimeter descriptions:

   Metes – A series of measurements typically bearings and distances around a polygon

   Bounds - A series of calls for either monuments or ownership of record around a polygon

   Metes and bounds – A combination of measures and calls, such as calls for monuments at the ends of lines, around a polygon.
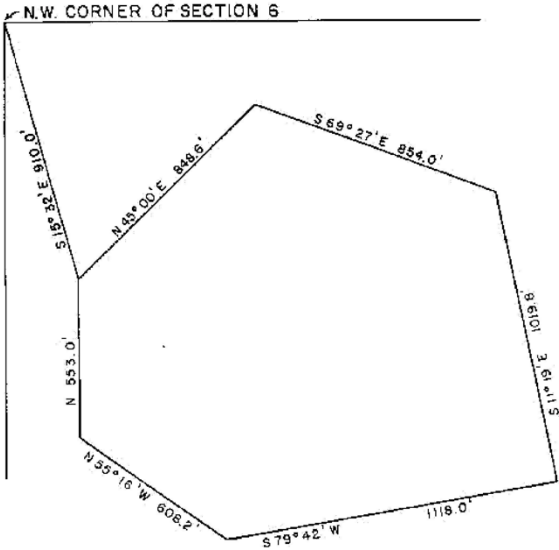

Figure 20 - Metes and Bounds Description

Beginning at a point, being the Northwest corner of this parcel, from which point the Northwest corner of section 6, T2lSRIE bears South 15° 32' East a distance of 910.0 feet. This information takes the survey to the point and place of beginning. Thence facing in the direction of Northeast the bearing is North 45° 00', East a distance of 848.6 feet. Thence facing in the direction of Southeast the bearing is South 69° 27' East going a distance of 854.0 feet. Thence facing the direction of Southeast the bearing is South 11°19' East for a distance of 1,019.8 feet. Thence facing Southwest the bearing is South 79° 42' West going a distance of 1,118.0 feet. Thence facing Northwest the bearing given is North 55°16' West for a distance of 608.2 feet. Thence facing due North the bearing is north for a distance of 553.0 feet. This last bearing brings the survey to the point and place of beginning and the parcel contains 40.006 acres more or less.

The advantage of the metes-and-bounds survey system is that it is useful in describing irregularly shaped land-ownership configurations which cannot be normally described by other generally accepted methods of land description. Many early descriptions referred to monuments that lacked permanency and surveyors failed to make their survey notes a matter of public record. This situation gave rise to frequent boundary line disputes and litigation. When the lines of an old survey are being relocated or a discrepancy exists between two tracts, the following precedence (weight of importance) usually applies:

> monuments (natural and man-made)
> adjoining owners
> distance
> direction
> size

3.6 Dependent Descriptions

Dependent land descriptions are categories that are less commonly used and typically depend upon components of the other land description categories. These land descriptions require interpretation by a land surveyor and may need to be transformed into a metes description to be mapped. These include:

> Description by Proportional Area – such as the north half or a described area
> Description by Area – such as the west 30 acres
> Description by Division Line – such as those lands west of a named feature such as river or road
> Description by Distance – such as the easterly 40 feet
> Description by Exception – all those lands in Section 30 except those southeast of a river.

3.7 Description by Coordinates

These are descriptions of the land from the mathematical positions of corners. With the increased use of positioning technology, many land surveys generate the adjusted coordinated values of property corners as a part of the land survey observations. These coordinates are another observation and can describe the extent of the property. Historically coordinates were considered a derived value; derived from line of sight and ground measurements and have been considered a "last resort" as evidence of corner placement. While a physical monument is likely to persist over a mathematical coordinate on the ground, it is also likely that the distance and distraction will eventually be derived from the coordinate. The order of evidence and acceptance of coordinate values for legal descriptions are matters for the courts to resolve.

Coordinate descriptions should include the projection for the coordinates, the datum basis, and any information necessary to reproduce the coordinate values.

3.8 Unresolved

These are land descriptions that cannot be resolved into a definitive area and need to be further analyzed to produce a viable land description.

4. Coordinate Systems and Projections

It is necessary for county mappers to locate parcels and define their boundaries. Before automating data, it is essential to identify an appropriate datum, map projection, and units. The State standard parcel identifier (UPC) is determined by using feet. There are two commonly used foot measurements the US foot and the International foot. New Mexico currently uses the US foot but will be adopt the international foot when new state plane coordinates are adopted. The difference in length is one part in 10,000 and should not affect the UPC values.

Geodetic datum defines the size and shape of the earth and the origin and orientation of the coordinate systems used to map the earth. Map projections are techniques for transforming the three-dimensional sphere of the earth into the two dimensions of a map. Many systems provide location information for a given point on the earth, referred to as a coordinate. There are many different coordinate systems based on a variety of geodetic datums, units, projections and reference systems in use today (Dana[2]). One of the best-known coordinate systems is latitude and longitude. The original development of the system is unknown, but many historians attribute the initial concept to Phoenician or Egyptian navigators. Latitude and longitude may be used for parcel identification, although there are other planar (x, y) systems that involve much simpler calculations than the curvilinear geometry of latitude and longitude. Two planar systems are discussed in this chapter: Universal Transverse Mercator and State Plane Coordinate System.

Geodetic datums are a reference system to measure positions, compute distances and direction and produce maps, charts and precise surveys. Many different datums, since Aristotle's estimation of the earth's size, have evolved in recent years due to the use of space-based technologies such as the Global Positioning System (GPS). There are two types of datums: horizontal (latitude and longitude) and vertical (elevation). For assessors cadastral data or parcel data the basis is a horizontal datum. Datums are an important factor in mapping in a GIS. Geodetic coordinates that reference the wrong datum can result in positional errors of hundreds of meters.

Hundreds of geodetic datums are in use around the world. Most civilian geospatial activities in the United States use the North American Datum of 1983 (NAD83), and rarely, the now outdated predecessor, NAD27. Assessors are required to reference their submitted data in NAD83. Furthermore, whenever possible, the most current version of NAD83 should be used.

There are presently two slightly different versions of the NAD83 datum in use in New Mexico. Another revision NGRS 2022 will be available soon. Users should be particularly careful to identify the specific version they are utilizing. These datum versions are identified by specifying the year in which the adjustment was performed by the National Geodetic Survey to determine the published coordinates for points in the National Spatial Reference System. The original version of NAD83 is referred to as NAD83 (1986). Subsequent to the completion of the original adjustment, GPS was used to improve the accuracy of the network and the updated version is referred to as NAD83 (1992) in New Mexico.

The adjustment year varies from state to state. The improved version of NAD83 is known as the High Accuracy Reference Network (HARN) or High Precision Geodetic Network (HPGN) - two names that mean the same thing. It is important to note that these different versions are all NAD83; they are the same datum simply representing minor refinements to the reference system.

5. Publicly Owned Lands

The primary emphasis of tax parcel mapping are the taxable lands. However, it is important for county land management to have a full inventory of all lands in the county including the non-taxable lands. As described in Section 2.1 above, there are four levels of parcel mapping. Beginning with Level 3, this includes mapping non-taxable polygons with public and exempt lands. In New Mexico this will be primarily state and federal lands and will include some tribal and non-profit lands.

One resource for checking federally managed lands is the BLM's Master Title Plat (MTP). These are PLSS township based maps that compile federally managed lands that have been recorded in the BLM's land record system. Once land is patented, meaning the federal government has issued a quit claim deed passing ownership out of federal ownership. Subsequent transactions are not tracked in the MTP, but the MTP will indicate if the patent reserved any federal interests. The most common reserved rights include mineral, ditches, and canals (D/C).

The BLM's General Land Office Records Master Title Plat system is available from the URL below:
https://glorecords.blm.gov/search/default.aspx

The help menu on the GLO web page provides additional guidance on how to use the site.

Another source for federal and tribal non-taxable lands is the Protected Areas Database for the US (PAD-US). The latest version can be found at this web site.

https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap/science/protected-areas

A description of the data set from the PAD-US site. "Lands in PAD-US are mainly open space/resource lands owned in fee by agencies and non-profits. Conservation easements suitable for distribution in the public domain are also included. The current data set includes the "GAP Status Codes" of these lands, indicating how they are being managed for conservation purposes. A measure of public access for recreation is also included. PAD-US includes all Federal and most State lands, and many areas at regional and local scales, with plans underway to expand these holdings in the database." PAD-US includes a link to the source agency as well as the aggregation of the data from multiple agencies.

6. Rights of Way and Easements

As described in Section 2.1 above, there are four levels of parcel mapping. Level 4 addresses "rights of way." These are typically highway/roadway rights of way that are dedicated or purchased lands. This means that the adjacent landowners' boundaries are defined by the edge of the right of way.

Mapping rights of way requires highway/roadway right of way plats. Typically rights of ways should be subdivided at political subdivision boundaries and PLSS Township boundaries. This divides the right of way into manageable polygons. Some jurisdictions may break right of ways at the section boundaries and assign a unique UPC to each of the respective polygons.

7. Quality Checks

Tax parcel data sets should be quality checked. Although not mandatory, it is recommended that parcel mappers adopt this practice. A variety of quality checks will be performed during the statewide parcel data aggregation process.

7.1 Geometry Quality Checks

Geometry checks verify that the tax parcel polygons all close and that all polygons are present. If the county tax data has condominiums, it is possible that there may be stacked geometry. Other than condominiums, the tax parcels should not contain any stacked or overlapping polygons.

Internal Geometry Quality Checklist
Internal geometry errors are fundamental geometry structure issues and are independent of the content or subject matter of the features. These errors can be fixed in Esri software using either the Repair Geometry or the Check geometry tool. This tool does not create an output. With this tool the repairs are performed, and the existing feature is replaced with the repaired feature. If there is any uncertainty about possible changes or updates, this tool should be run on a copy of the data. QGIS and other GIS/mapping applications may have comparable quality tools such as Geometry Checker Plugin. This tool will need to be configured on the first use. It will perform the same operations as the Esri tools. The following are the geometry errors that are checked and repaired with these tools.

1. Null geometry – Null geometry are records in the GIS data set that do not have an associated geometry. That is, the record was created but the geometry was not constructed for the record.

2. Short segments – Short segments are unintended small line segments that can be introduced during construction or geoprocessing operations, typically well below the spatial resolution or accuracy.
3. Incorrect ring ordering – This is an Esri internal polygon construction and maintenance feature that assures segments are ordered in sequence around the polygon.
4. Incorrect segment orientation – This is related to the ring ordering. Internally the segments in a polygon need to be headed in an increasing order around the polygon.
5. Self-intersections – These are polygons that intersect themselves creating an indistinct or unresolved polygon.
6. Unclosed rings – This is the same as an unclosed polygon that occurs when the beginning and ending points are not exactly matched.
7. Empty parts – These are same, essentially, as null geometry.
8. Duplicate vertex – Duplicated vertices occur when there are stacked vertices or when more than one vertex is in the same place, can be more than two but typically it is two.
9. Mismatched attributes – The Z or M coordinate do not match
10. Discontinuous parts – Multiple parts need to be created from existing discontinuous parts.
11. Empty Z values – The Z value has to be 0. It cannot be empty or null.
12. Bad envelope – The feature's envelope is an internal management issue and can be fixed but the feature has to sit inside its designated envelop which is used for identifying and selecting.

Content Geometry Quality Checklist

The content quality is subject matter specific. These are quality checks related to the inherent definition of the features being mapped, in this case tax parcels. For example, tax parcels should not overlap. If two adjacent tax parcels have legal descriptions that overlap more than the acceptable description tolerances, this overlap area should be marked as an overlap in the production system and tracked as a separate overlap polygon. Similarly, gaps, other than known or defined gaps such as rights of way, should also be mapped and noted in the production data set. Some jurisdictions maintain identified gaps and overlaps in an errata data or conflict data set that is separate from the primary parcel feature. The primary tax parcel data set that is used for public facing maps and data distribution should resolve or edge match these errors. The tax parcel map should represent a continuous and complete coverage of taxable lands. The quality content geometry errors can usually be found by a few simple topology rules and joins to the tax record files.

1. *Gaps and Overlaps* – Tax parcels should not overlap unless it is an intentional stacking for features like condominiums. Stacking polygons is not the preferred method for tracking condominium records, but it is acknowledged that this has been a past practice. Small gaps between adjacent tax parcel polygons should be edge matched and removed.

2. *Coincident geometry or vertical integration* – Tax parcel boundaries that are coincident with other features should be aligned to and be coincident with that feature. For example, a boundary could be the "centerline of a river" or tied to the international boundary, or a city or county boundary.

3. *No multipart polygons* – Multipart polygons are non-contiguous polygons that are in the same feature. If a deed has multiple non-contiguous parcels, each separate parcel should get a separate UPC. Similarly, contiguous parcels in a single deed can be combined into a single ownership parcel with one UPC. In some cases, the tax records may have one record for non-taxable lands such as federally owned property and the GIS may have multiple polygons.

4. *Complete* – The tax parcel geometry should have at least one polygon for every tax record. The exceptions are condominiums which may have a one-to-many relationship to the tax records, i.e. one polygon related to many tax records.

7.2 Attribute Quality Checks

Attribute quality checks verify the content and values of the attributes assigned to a polygon. One of the most important attributes for the parcel map is the Parcel Identifier. Every polygon in the tax parcel map must have a unique identifier for the polygon. Additionally, for taxable parcels there must be an identifier that connects the polygon to the CAMA record.

1. All required fields should be fully populated – Review the attribute tables and verify there are no nulls in the required fields.
2. Correctly coded values – Review that the content of coded domains such as property tax district is correct.
3. All taxable parcels link to at least one record in the CAMA data set – One tax parcel may have more than one tax record, such as condominiums but every taxable polygon must have at least one record.
4. All CAMA Records are mapped – verify that all records in the CAMA data set have a corresponding tax polygon, even if some are not taxable.
5. UPC Must be present and correct for all mapped polygons.
6. GIS data connects to CAMA.

Appendix A – Uniform Property Code

All tax parcels in New Mexico must be coded with a unique Uniform Property Code (UPC). The UPC consists of 13 digits with an additional 4 digits to code multi-records that are associated with one land parcel. This specification describes the process of coding the UPC. Only multi-record parcels use the additional 4 digits (i.e., condominiums). Coding of the last four digits is described at the end of this section. Artificial codes, such as all 9's or 0's should not exist. In land grants or other areas without a legally defined rectangular Public Land Survey System, the state of New Mexico has defined a projected (unsurveyed, unprotracted) rectangular grid that should be used in lieu of the surveyed PLSS to define the UPC.

Each tax parcel within a county must bear a unique UPC, coded to the center of the parcel. The 13-digit code must be expressed as; x-xxx-xxx-xxx-xxx. (1-222-333-444-555). Below is a detailed description of the UPC:

1. The first number denotes in which quadrant the center of the parcel lies.
2. The next three digits denote the number of sections East or West of the NMPM.
3. The following three digits denote the number of sections North or South of NMBL.
4. The next three digits denote the number of feet East or West within the section to the centroid of the property wherein the center of the parcel is located. Last digit of the East/West distance is dropped (i.e., 1,155 ft is coded 115).
5. The following three digits denote the number of feet North or South within the section to the centroid of the property wherein the center of the parcel is located. Last digit of the North/South distance is dropped (i.e., 3,450 is coded 345).

The State of New Mexico publishes a standardized UPC PLSS data set that will be used to reference the UPC location. This data set provides complete coverage of the state and is set or frozen at a specified date. The legal PLSS may be continuously updated and adjusted, but the UPC PLSS will remain as specified for a longer period providing a stable basis for assigning UPC Codes. Note that over time the legal PLSS may adjust and diverge from the UPC PLSS. If this variation becomes too great, the State will update the UPC PLSS. The parcel data set metadata should specify the vintage of the UPC PLSS by indicating the year of the data set.

Parcels will be coded for the most accurate location using the following steps:

1. To determine the first digit, find the quadrant in which the county is located. New Mexico is divided into four quadrants. Figure A.1 illustrates this division. As illustrated in Figure A-1, some counties are in more than one quadrant. For example, Socorro County is in all four quadrants, therefore the county will have parcel codes starting with a 1, 2, 3, or 4.

Figure A.1: Map of New Mexico Illustrating the Four Quadrants
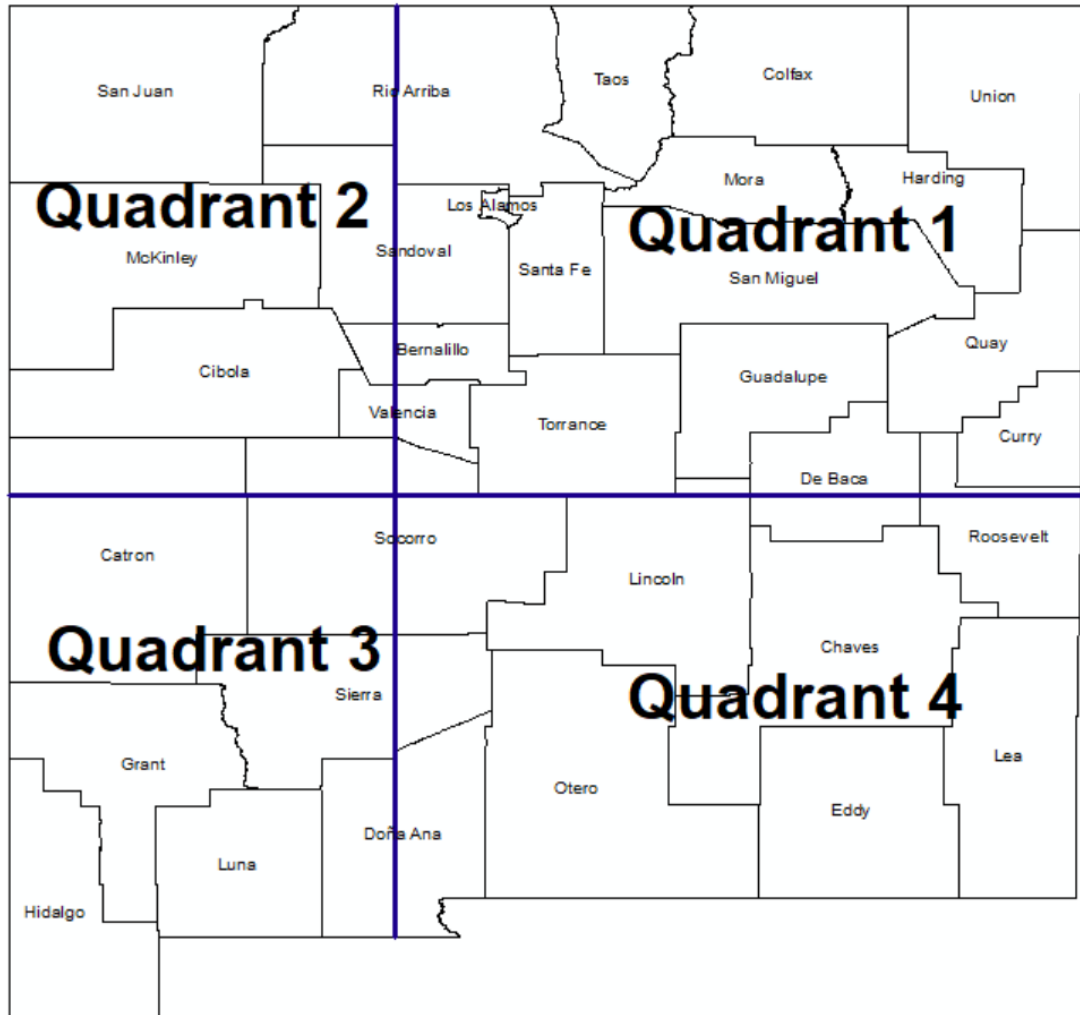
Figure A-1 UPC Quadrants

2. To code the next 12 digits, described in steps 3 and 4, make all measurements from the corner nearest the PLSS Initial Point.

      the southwest corner of the section in quadrant #1,
      the southeast corner of the section in quadrant #2,
      the northeast corner of the section in quadrant #3, and
      the northwest corner of the section in quadrant #4.

3. The next six digits are determined as follows.

In Quadrant #1, PLSS Township designations North and East. The section code number is determined by counting the number of sections East of the Principal Meridian and the number of sections North of the New Mexico Base Line, in that order.

In Quadrant #2, PLSS Township designations North and West. The sections code number is determined by counting the number of sections West of the Principal Meridian and the number of sections North of the New Mexico Base Line, in that order.

In Quadrant #3, PLSS Township designations South and West. The section code number is determined by counting the number of sections West of the Principal Meridian and the number of sections South of the New Mexico Base Line, in that order.

In Quadrant #4, PLSS Township designations South and East. The section code number is determined by counting the number of sections East of the Principal Meridian and the number of sections South of the New Mexico Base Line, in that order.

4. To code the last six digits from the respective section corner.

In Quadrant #1, the section code number is determined by measuring the number of feet East of the SW section corner and then number of feet North, in that order

In Quadrant #2 the sections code number is determined by measuring the number of feet West of the SE section corner and then number of feet North, in that order.

In Quadrant #3 the section code number is determined by measuring the number of feet West of the NE section corner and then number of feet South, in that order.

In Quadrant #4 the section code number is determined by measuring the number of feet East of the NW section corner and then number of feet South, in that order.

As an example, a parcel is coded to the centroid of the property and is recorded (Figure A.2).
1-052-097-115-345
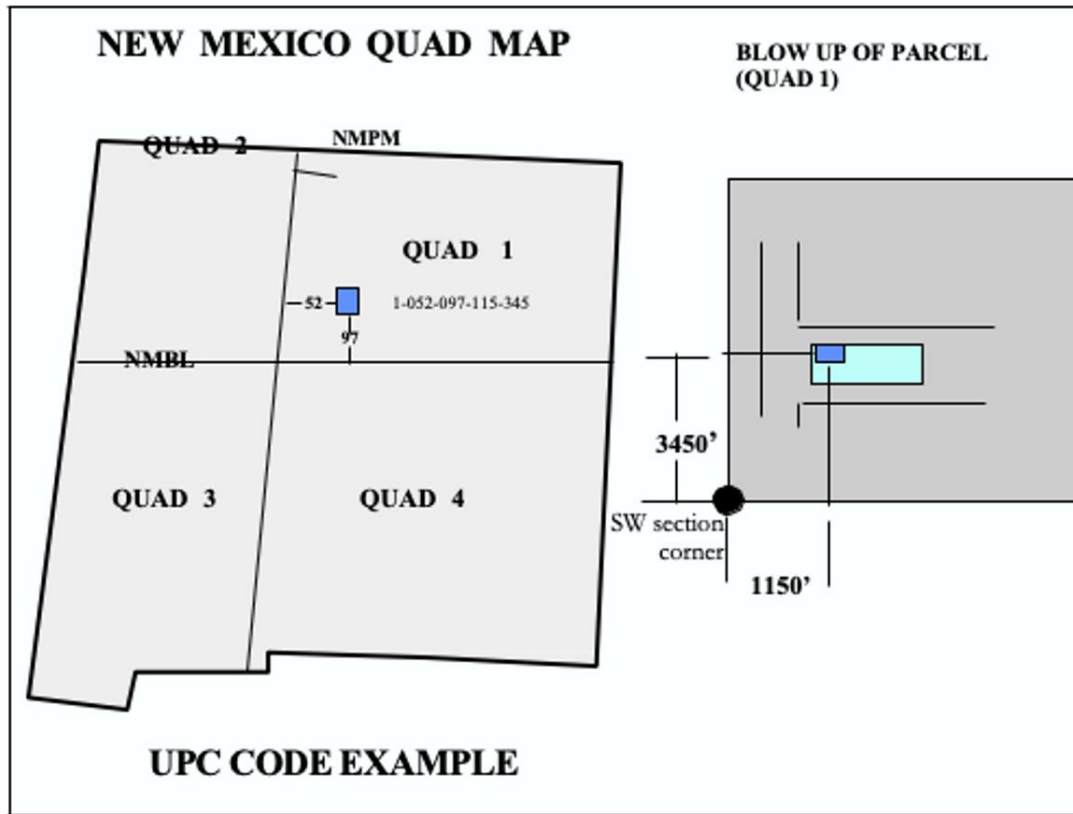
Figure A-2 Example UPC Code

The parcel is in Santa Fe County, which puts the parcel in quadrant #1. Now begin at the intersection of the New Mexico Principal Meridian and the New Mexico Base Line (the New Mexico PLSS Initial Point), then go east along the New Mexico Base Line counting the sections until the corner section where the parcel lies is reached. Thence, go north of the base line 97 sections to locate the corner section wherein the parcel lies. Thus, beginning at the Southwest corner of the section and measuring 1,150 feet to the east, then 3,450 feet north locates the centroid of the parcel. The parcel code is: 1-052-097-115-345.

In many cases sections are neither square nor rectangular. See Figure A-3 as an example. Note that the south line of Section 1 deviates an east-west orientation.

Figure A-3 - Example non-square Section

In that event measurement begins at the section corner of the oblique section along imaginary lines that are closest and parallel to the New Mexico Base Line and Principal Meridian. (Figure A-4)

Figure A-4 Measurement Lines Parallel to the Principal Meridian and Baseline

If a block or lot extends into more than one quad in a section, the major portion of the parcel shall carry the code. The same applies to parcels lying in more than one section. Always measure from a section corner, which is closest to the New Mexico initial point (intersection of the New Mexico Baseline and New Mexico Principal Meridian).

Frequently a property owner has land that is divided by a highway, road, river, creek, arroyo, canal, irrigation ditch or railroad.

CODING HALF TOWNSHIPS

Many counties in New Mexico have correction sections as described in under the United States Public Land Survey section. When the State first started coding the sections, these corrected sections were disregarded. This has become a problem in many of New Mexico's counties.

There are sixteen half townships or half ranges in New Mexico. These are highlighted in Figure A-5.
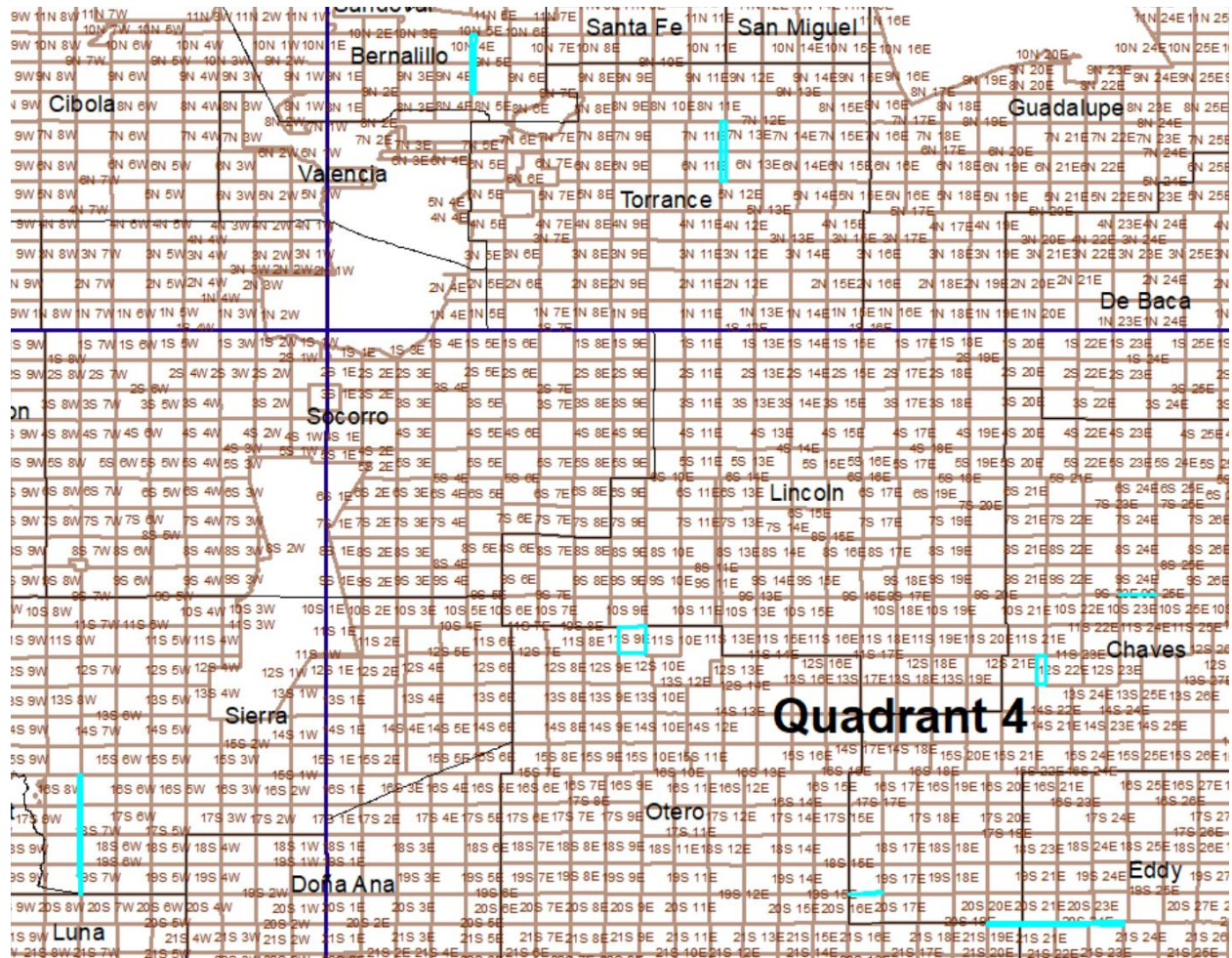
Figure A-5 New Mexico Half Townships and Half Ranges

Because the UPC relies on the "column" and "row" count for the section identification, i.e. the number of section columns and rows from the initial point and the half townships and ranges do not extend border to border, this can create an incrementing error in the UPC Coding. These half townships and ranges are handled differently in each county.

At least one county has applied the "corrected-quadrant code", defined in the original parcel manual and shown in Figure A-6. The only number that changes is the quadrant number. The remaining twelve (12) digits will be coded as stated in the previous section. Below is an example:

Example: ?-xxx-xxx-xxx-xxx
     (1)   (2)   (3)

"Corrected section code" is used to determine the alternate quadrant number. See Figure A-6.
The next three digits denote the number of sections East or West of the New Mexico Principal Meridian and the following three digits denote the number of sections North or South of New Mexico Baseline. Measurement in feet to the centroid of the parcel

Figure A-6 Corrected Quadrant Numbers for half Townships and Ranges

Other counties recognized the added partial row and column introduced with the half areas and incremented through these areas.

Still other counties have not adopted the UPC system and did not encounter this issue.

The goal of the UPC is to generate a unique identifier based on the PLSS position of the parcel centroid. Counties do not need to renumber or change their current methods for addressing the half townships and half ranges. However, longer term New Mexico may want to consider a different scheme for a statewide parcel numbering system.

RULES TO FOLLOW WHEN ASSIGNING UPC'S TO PARCELS

Each deed with one or multiple contiguous parcels will have one UPC associated with it.

If one deed has multiple non-contiguous parcels, then each parcel shall have a unique UPC associated with it.

Only assign a UPC to the parcel, do not assign a UPC to a homestead.

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Start coding each parcel from the: SW section corner in quadrant 1, SE section corner in quadrant 2, NE section corner in quadrant 3 and NW section corner in quadrant 4.

If a contiguous parcel lies in multiple townships or sections, code the first 7 digits from the starting section corner only. Additional UPC's are not necessary for each township or section that is contiguous with the property being coded.

The UPC should only be thirteen (13) numerical digits, unless coding multiple records (example: condominiums) to one land parcel.

Definitions:
       Multiple Parcels: More than one parcel and are typically non-contiguous.
       Multiple Records: One land parcel with multiple ownerships (records), for example condominiums.
       Mapping multiple ownership parcels: A deed may describe multiple units of land or multiple parcels. Contiguous parcels should all have one UPC. Non-contiguous parcel should have separate UPCs. Each mapped parcel must be associated with a UPC.
       Multi-part Polygons: These are polygons with noncontinuous features in the same GIS feature. There should not be multipart polygons in the tax parcel GIS data set.

One UPC must be associated with only one property record card. Digitally linking the parcel with an attribute (UPC) to a database, the attribute must be unique. This would be a straightforward method if each parcel shown on the map had exactly one association linked to it.

This is not always the case. For example, multiple condominium or co-op records can be associated with a single land parcel. When mapping condominiums, the condo is represented by one parcel on the map, but each unit within the complex will have an ownership card associated to it. One parcel on the map will have many associated records. This relationship is called one-to-many relationship between condominium parcels in the GIS.

When coding the condominium parcel, first code the parcel itself, and then code each unit consecutively thereafter. Use the additional digits in the UPC to code the condominium units. For example, if the condominium parcel is coded 1-020-010-346-120, then the first unit is coded 1-020-010-346-120-0001.

When joining a database to the parcel map, a common field is used (UPC) to join the two. Through this linkage a record in the database that matches the value of the parcel will become the associated attributes to the parcel. For this linkage to work as a one-to-many relationship there must be a common UPC between the "parent" parcel and each condo unit in the database. Individual units have a four-digit suffix added to them, which is the reason four digits were added to the UPC.

There are many ways of dealing with the one-to-many relationship that occur with multi-ownership or co-op records. The method described in this chapter will assist the county to perform a query of multi-ownership parcels. With this proper structure, all of the property-related applications that are key to a county GIS can function without ignoring the condo records that exist.

Appendix B – Domains of Values (Codes)

County Federal FIPS codes

County Name	County FIPS Id	Legacy County Id (these may not be present)
Bernalillo	35001	2
Catron	35003	28
Chaves	35005	4
Cibola	35006	33
Colfax	35007	9
Curry	35009	5
De Baca	35011	27
Dona Ana	35013	7
Eddy	35015	3
Grant	35017	8
Guadalupe	35019	24
Harding	35021	31
Hidalgo	35023	23
Lea	35025	6
Lincoln	35027	26
Los Alamos	35028	32
Luna	35029	19
McKinley	35031	13
Mora	35033	30
Otero	35035	15
Quay	35037	10
Rio Arriba	35039	17
Roosevelt	35041	11
Sandoval	35043	16
San Juan	35045	12
San Miguel	35047	29
Santa Fe	35049	1
Sierra	35051	21
Socorro	35053	25
Taos	35055	20
Torrance	35057	22
Union	35059	18
Valencia	35061	14

Tax district codes

County Name	County Id	Tax District Name
Bernalillo	35001	12-IN
Bernalillo	35001	12-IN-LR
Bernalillo	35001	12-IN-T
Bernalillo	35001	12-OUT
Bernalillo	35001	12-OUT
Bernalillo	35001	24 OUT
Bernalillo	35001	8-T
Bernalillo	35001	New Mexico State Fairgrounds
Bernalillo	35001	R1-A
Catron	35003	1-IN
Catron	35003	1-OUT
Catron	35003	2A-OUT
Catron	35003	2-OUT
Chaves	35005	14
Chaves	35005	1-IN
Chaves	35005	1L
Chaves	35005	1-OUT
Chaves	35005	20-IN
Chaves	35005	20-OUT
Chaves	35005	27/28
Chaves	35005	6-IN
Chaves	35005	6-OUT
Chaves	35005	8-IN
Chaves	35005	8-OUT
Cibola	35006	3-A-IN
Cibola	35006	3-IN
Cibola	35006	3-OUT
Cibola	35006	QM02
Colfax	35007	11-IN
Colfax	35007	11-OUT
Colfax	35007	24-IN
Colfax	35007	24-OUT
Colfax	35007	26-IN
Colfax	35007	26-OUT
Colfax	35007	35
Colfax	35007	3A-IN
Colfax	35007	3B-IN
Colfax	35007	3-IN
Colfax	35007	3-OUT
Curry	35009	12-IN
Curry	35009	12-OUT
Curry	35009	1-IN
Curry	35009	1-OUT
Curry	35009	2-IN
Curry	35009	2-OUT
Curry	35009	61-IN
Curry	35009	61-OUT
De Baca	35011	20-IN
De Baca	35011	20-OUT
Dona Ana	35013	11-IN

Dona Ana	35013	11-OUT		Harding	35021	5-OUT
Dona Ana	35013	16-IN		Hidalgo	35023	1-A-IN
Dona Ana	35013	16-OUT		Hidalgo	35023	1-IN
Dona Ana	35013	18-IN		Hidalgo	35023	1-OUT
Dona Ana	35013	2D-IN		Hidalgo	35023	6
Dona Ana	35013	2-IN		Lea	35025	16-IN
Dona Ana	35013	2-OUT		Lea	35025	16-OUT
Eddy	35015	10-IN		Lea	35025	19-IN
Eddy	35015	10-OUT		Lea	35025	19-OUT
Eddy	35015	16D-IN		Lea	35025	1-IN
Eddy	35015	16-IN		Lea	35025	1-OUT
Eddy	35015	16-OUT		Lea	35025	28-IN
Eddy	35015	C-IN		Lea	35025	28-OUT
Eddy	35015	C-OUT		Lea	35025	8-IN
Grant	35017	1-IN		Lea	35025	8-OUT
Grant	35017	1-OUT		Lincoln	35027	13-IN
Grant	35017	2B-IN		Lincoln	35027	13-OUT
Grant	35017	2C-IN		Lincoln	35027	20
Grant	35017	2H-IN		Lincoln	35027	28-IN
Grant	35017	2-OUT		Lincoln	35027	28-OUT
Guadalupe	35019	33-IN		Lincoln	35027	28-RU IN
Guadalupe	35019	33-OUT		Lincoln	35027	3/35-OUT
Guadalupe	35019	8-IN		Lincoln	35027	35-IN
Guadalupe	35019	8-OUT		Lincoln	35027	3-IN
Harding	35021	24/25		Lincoln	35027	7-IN
Harding	35021	3-IN		Lincoln	35027	7-OUT
Harding	35021	3-OUT		Los Alamos	35028	1
Harding	35021	5-IN		Los Alamos	35028	1

County	Code	District
Luna	35029	1A-IN
Luna	35029	1-IN
Luna	35029	1-OUT
McKinley	35031	1-IN
McKinley	35031	1-OUT
McKinley	35031	Zuni
Mora	35033	1
Mora	35033	12-C
Mora	35033	12-IN
Mora	35033	12-OUT
Mora	35033	1-A
Otero	35035	11-IN
Otero	35035	11-OUT
Otero	35035	16
Otero	35035	1-IN
Otero	35035	1-OUT
Otero	35035	4-IN
Otero	35035	4-OUT
Quay	35037	19-IN
Quay	35037	19-OUT
Quay	35037	1-IN
Quay	35037	1-OUT
Quay	35037	23/47
Quay	35037	32-IN
Quay	35037	32-OUT
Quay	35037	33
Quay	35037	34-IN
Quay	35037	34-OUT
Quay	35037	53
Rio Arriba	35039	19-IN
Rio Arriba	35039	19-OUT
Rio Arriba	35039	21
Rio Arriba	35039	32
Rio Arriba	35039	53
Rio Arriba	35039	55-IN
Rio Arriba	35039	55-OUT
Rio Arriba	35039	6T
Roosevelt	35041	19603
Roosevelt	35041	1-IN
Roosevelt	35041	1-OUT
Roosevelt	35041	2-IN
Roosevelt	35041	2-OUT
Roosevelt	35041	3
Roosevelt	35041	39A-IN
Roosevelt	35041	39-IN
Roosevelt	35041	39-OUT
Roosevelt	35041	5-IN
Roosevelt	35041	5-OUT
Roosevelt	35041	9A
Sandoval	35043	1 OUT
Sandoval	35043	1-IN
Sandoval	35043	1-OUT
Sandoval	35043	20-IN
Sandoval	35043	20-OUT
Sandoval	35043	2A-IN
Sandoval	35043	31A-IN

Sandoval	35043	31-IN	Sierra	35051	6 EB
Sandoval	35043	31-OUT	Sierra	35051	6-IN
Sandoval	35043	94 IN	Sierra	35051	6-OUT
Sandoval	35043	94 OUT	Sierra	35051	6W-IN
San Juan	35045	22-IN	Socorro	35053	12-IN
San Juan	35045	22-OUT	Socorro	35053	12-OUT
San Juan	35045	2-IN	Socorro	35053	13L
San Juan	35045	2-OUT	Socorro	35053	13T
San Juan	35045	5-IN	Socorro	35053	1-IN
San Juan	35045	5-OUT	Socorro	35053	1-OUT
San Juan	35045	61/20	Socorro	35053	5
San Juan	35045	6-IN	Socorro	35053	7L
San Juan	35045	6-OUT	Taos	35055	1-IN
San Miguel	35047	1-IN	Taos	35055	1-OUT
San Miguel	35047	1-OUT	Taos	35055	4
San Miguel	35047	21-IN	Taos	35055	6
San Miguel	35047	21-OUT	Taos	35055	8-18-IN
San Miguel	35047	2-IN	Taos	35055	9-IN
San Miguel	35047	2-OUT	Taos	35055	9-OUT
San Miguel	35047	50	Taos	35055	9RR-IN
Santa Fe	35049	1 and 1/1D	Torrance	35057	13-IN
Santa Fe	35049	18-IN	Torrance	35057	13-OUT
Santa Fe	35049	18-OUT	Torrance	35057	16-IN
Santa Fe	35049	8T-IN	Torrance	35057	16-OUT
Santa Fe	35049	8T-IN-A	Torrance	35057	20/35
Santa Fe	35049	8T-OUT	Torrance	35057	7-IN
Santa Fe	35049	C IN	Torrance	35057	7-OUT
Santa Fe	35049	C OUT	Torrance	35057	7W-IN

Torrance	35057	8-IN	**Valencia**	35061	1 IN
Torrance	35057	8-OUT	**Valencia**	35061	1-BF IN
Union	35059	1-IN	**Valencia**	35061	1-OUT
Union	35059	1-OUT	**Valencia**	35061	1RC-IN
Union	35059	22D-IN	**Valencia**	35061	2-IN
Union	35059	22F-IN	**Valencia**	35061	2-OUT
Union	35059	22G-IN	**Valencia**	35061	3BN OUT
Union	35059	22-OUT	**Valencia**	35061	3LL OUT
Union	35059	49	**Valencia**	35061	PR IN

The DFA "Certificates of Property Tax Rates" are the source of these tax district codes.

https://www.nmdfa.state.nm.us/local-government/budget-finance-bureau/property-taxes/certificates-of-property-tax-rates/

Land Use Codes

Property use classification system to facilitate searching for data across Counties

$$\underbrace{\underset{\text{PRIMARY}}{X} \quad \underset{\text{TYPE}}{X} \quad \underset{\text{USE}}{XX} \quad \underset{\text{EXEMPTION}}{X}}_{\underset{\text{USE CODE}}{XXXXX}}$$
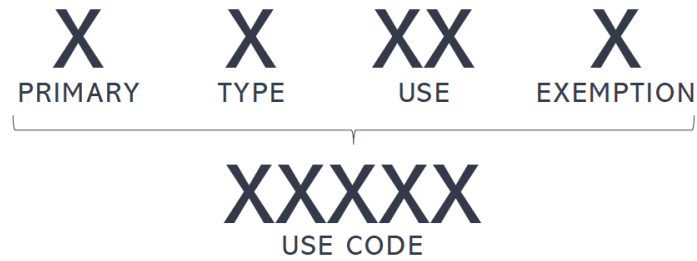
Primary: residential or non-residential indicator
      (R) Residential
      (NR) Non-Residential

Type: Property type
      (R) Real
      (P) Personal
      (M) Mobile
      (C) Centrally Assessed Use

Use: Secondary classification to describe property use
      (00) Not Defined
      (10) Vacant
      (11) Mobile Lot
      (20) Single Family
      (21) Multiple Family
      (22) Condominium
      (23) Apartments
      (30) Commercial
      (31) Industrial
      (32) Mixed
      (40) Agricultural
      (41) Agricultural Grazing
      (50) Livestock
      (51) Improvement Only
      (99) Other

Exemption: Indicates exemption status
      (E) Full
      (P) Partial
      (N) Not Exempt

Code elements are stored individually and combined programmatically.

Appendix C – Sample Metadata Record

This metadata record is text file that is included with the parcel file transmission to the state. It is <u>not</u> a full Federal Geographic Data Committee metadata record for the data set. This larger FGDC Metadata record can be created from the source data in ArcGIS Platform. Additional guidance on template wording and format for individual county FGDC Metadata Records may be added to this appendix in future versions.

The accompanying submission metadata text file provided with updated parcel data should be a simple text file with the following items. The metadata record should be named the same as the submission file with a .txt extension.

The tax year for the data file	2020
Format of the map data submission (CAD, shapefile, geodatabase, geojsn, etc)	File geodatabase
Name and version of mapping software	ArcMap 8.1
Level of parcel mapping included in the data set (1-5)	CAMA tax parcels - 3
Last update date reflected in the data set	December 2020
County contact for the parcel map data	Expert Parcel Mapper Pistol Pete County 999-888-7777 mapper@pistolpete.gov
Notes of any mapping format changes	County Land Use code has been added this year. No other changes were made

Addendums

New Mexico Parcel Mapping Manual, Version 2020.10

Technical Manual Addendum: 2022.10.ParAdjCty

Addendum:

Parcels That Span Adjacent Counties

Purpose:

> This addendum provides guidance to County Assessors and cadastral mapping staff on how to facilitate assessment of real property parcels that span (crossover) from one county to an adjacent county.

Based on PTD Guidance and input from County Assessor cadastral mapping staff, these suggested **Best Practices:**

Following the identification, by a County Assessor's Office or a taxpayer, of a parcel that fits this circumstance and requires a determination on which county the respective NOV and property tax bill should be derived from, follow this process...

1. Cadastral mapping staff from each county arrive at consensus about which of the respective counties contain the majority of land for the parcel in question.
   a. New Mexico County Boundary GIS reference layer:
      i. U.S. Census "PVS_21_v2_county_35_UTM_Z13_North"
2. Rather than the majority of land, consensus may also be based on improved value. The county with the greater improved value for the parcel in question determines where the NOV and tax bill are derived.
3. Assessors from each of the respective counties arrive at consensus based on "majority of land" or "greater improved value" and proceed to notify the taxpayer(s) of the determination.
4. The identified Assessor's Office proceeds through its normal property assessment workflow.

Uniform Property Code - Property Information Exchange Format

"UPC-PIE"

Purpose:

> This addendum provides justification, authorization, and guidance to County Assessors and cadastral mapping staff for the use of "UPC-PIE" as an alternative method for creating a real property parcel Uniform Property Code (UPC).

**Summary of the Public Lands Survey System (PLSS) Based UPC**

All tax parcels in New Mexico must be coded with a unique Uniform Property Code (UPC). The UPC consists of 13 digits with an additional 4 digits to code multi-records that are associated with one land parcel.

Each tax parcel within a county must bear a unique UPC, coded to the center of the parcel. The parcel center point may be a computed centroid or a visually placed point. The parcel center point must be contained in the parcel polygon.

The 13-digit code must be expressed as; x-xxx-xxx-xxx-xxx. (1-222-333-444-555). Below is a detailed description of the UPC:

1. The first number denotes the quadrant, defined by the Township/Range direction from the New Mexico Baseline and New Mexico Principal Meridian.
2. The next three digits denote the number of sections East or West of the New Mexico Principal Meridian (X direction).
3. The following three digits denote the number of sections North or South of the New Mexico Baseline (Y direction).
4. The next three digits denote the number of feet East or West within the section to the parcel center point. Last digit of the East/West distance is dropped (i.e., 1,155 ft is coded 115).
5. The next three digits denote the number of feet North or South within the section to the parcel center point. Last digit of the North/South distance is dropped (i.e., 3,450 is coded 345).

The quadrants for non-fractional townships are shown below (NE=1, NW=2, SW=4, and SE=4)
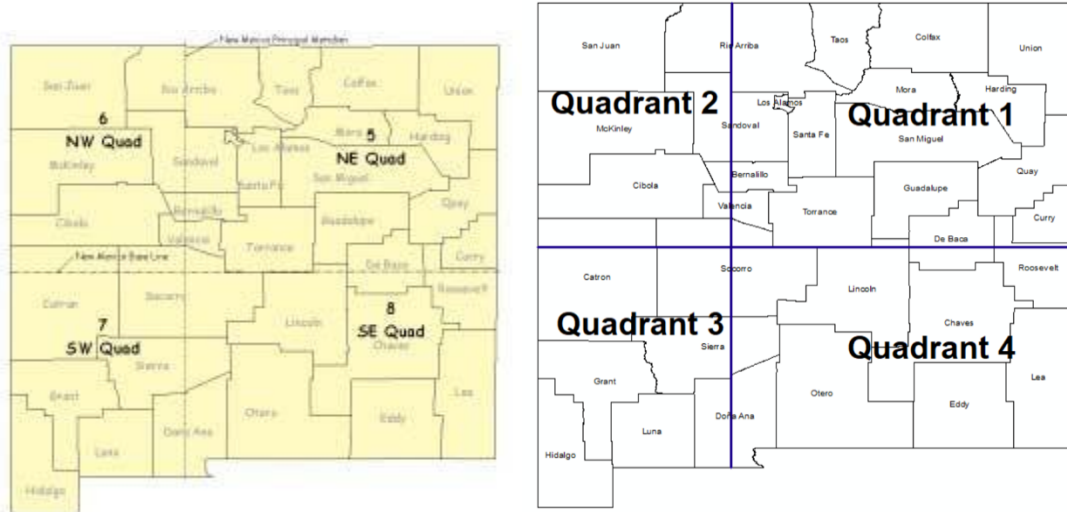
Quadrants 5, 6, 7, and 8 are used to code the half townships.

There are sixteen half townships or half ranges in New Mexico and historically the counties have not used the half township quadrant township codes or have used them inconsistently.

The second concern with the current UPC is New Mexico has many areas not covered by the rectangular PLSS. These are land grants and small tracts, and small holding claims that represent lands claimed prior to the rectangular survey. New Mexico has created a land grant index that covers many of these areas, not all of them but many. However, when the PLSS is updated the land grant index must be updated to edge match the index has to the updated rectangular PLSS.
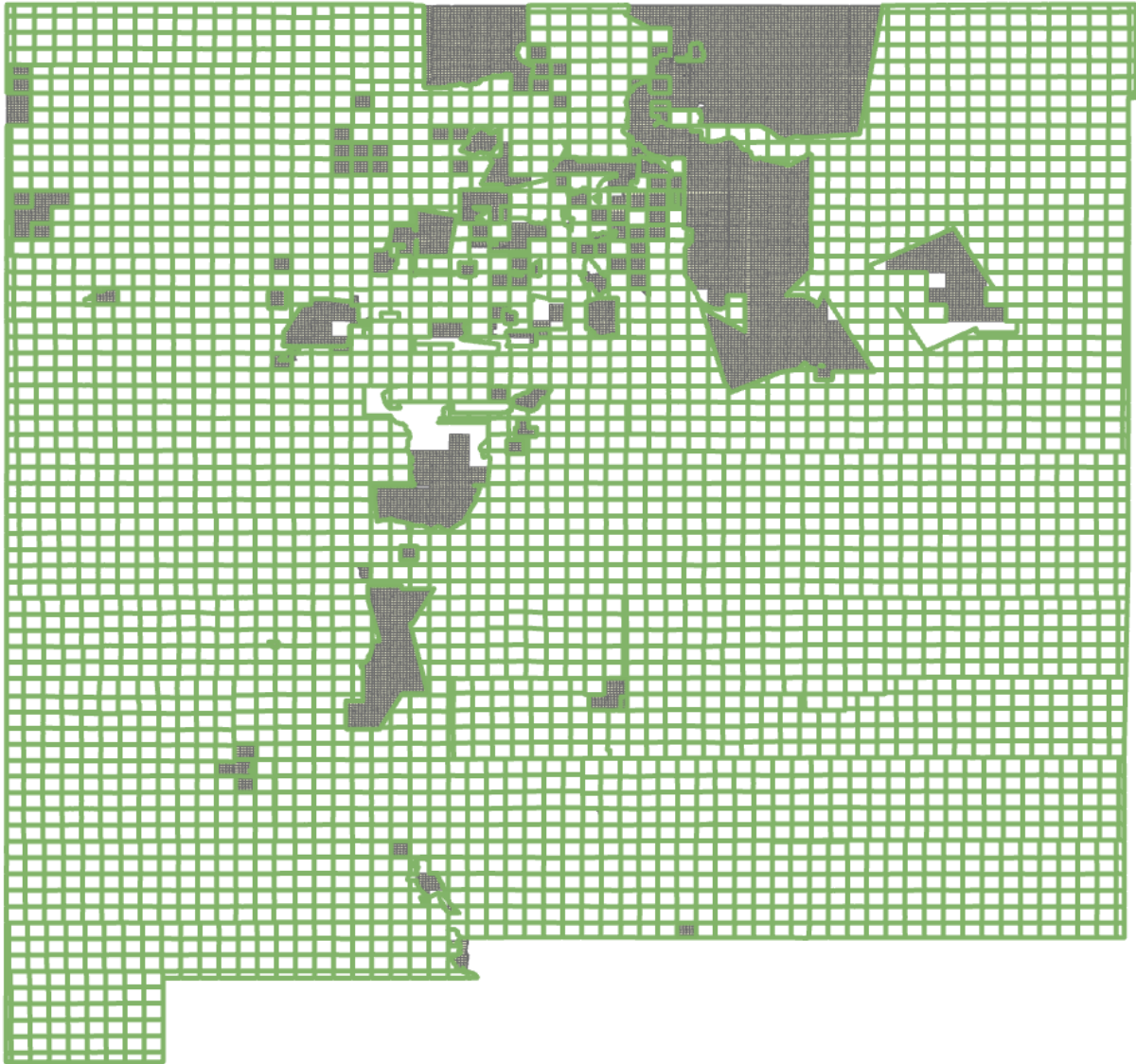
Green outline shows PLSS rectangular townships and the darker areas are the land grant index. The blank areas have neither land grant index nor PLSS Townships.

UTM Coordinate System (UPC-PIE)

The New Mexico statewide parcel data in the PTD Property Information Exchange (PIE) is projected in NAD83 UTM Zone 13 meters. This bounds the State by approximately 114,000 to 682,000 east coordinates and 3,474,000 to 4,102,000 north coordinates, see image below.

This alternative UPC coding method leverages existing PIE data resources by using the statewide parcel data set as a reference for newly coded UPC's and enables UPC coding from the PTD PIE Enterprise portal by using a web map application or by using ArcGIS Pro and a downloaded file geodatabase.

Example UPC-PIE for 249925.25 (X) 4001744.36 (Y) is 2499254001744

No truncation is necessary, only rounding to the nearest meter. Also, no punctuation, hyphens, or spaces are specified with the UPC-PIE.
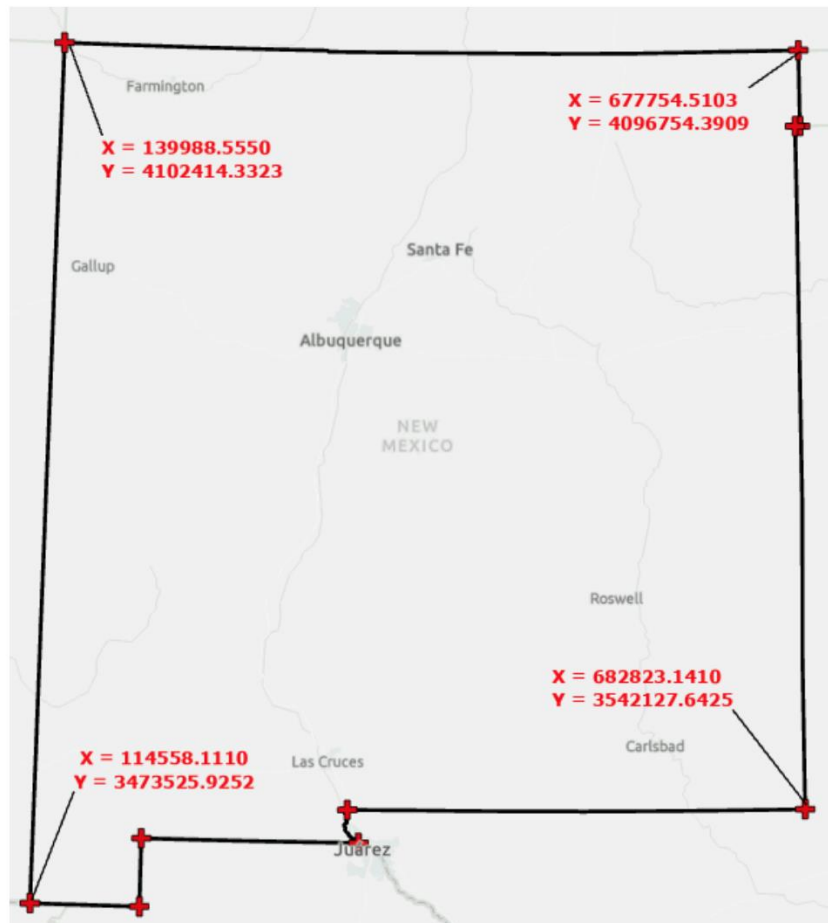
An ArcGIS StoryMap in the PTD PIE Enterprise portal further explains the design and use of the new UPC-PIE along with instructions for how to find and use the coding tools.

"UPC's Baked from the PIE"

https://nm.gis.axiomnh.com/portal/apps/storymaps/stories/31bc2bbacce2491f88d46b5d2322e293