



**ODOT RIGHT
OF WAY
ENGINEERING
HYBRID
TRAINING
2021**



**MIKE FALLERT, PLS
SENIOR RIGHT OF WAY ENGINEERING SURVEYOR
OREGON DEPARTMENT OF TRANSPORTATION
SALEM, OREGON**



ODOT RIGHT OF WAY ENGINEERING PROCESS

- This Document is NOT intended to be a Directive or a Manual.
- This Document is a brief Workflow with tips and tricks included to Aide in the development of ODOT's Right of Way Engineering (RWE) products for the acquisition of properties for ODOT projects.
- Always consult the ODOT Right of Way Engineering Manual and ODOT Region RWE Surveyors for any conflicts or direction.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- THE BIRTH OF A PROJECT TYPICALLY BEGINS IN:
- The Statewide Transportation Improvement Program (STIP) is the Oregon Department of Transportation's capital improvement program for state and federally-funded projects. The Oregon Transportation Commission and ODOT develop the STIP in coordination with a wide range of stakeholders and the public.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Once a project is chosen from the STIP a team is assembled lead by a Project Leader and typically a Roadway Designer sets the footprint for the project based on the Scoping notes, current standards and the needs of the individual Disciplines involved in the project.
- The initial Area of Impact (API)(footprint) is established and Survey is ordered for both the Right of Way (R/W)Retracement and Topography mapping.
- Survey's first task is:
 - Research and Planning
 - R/W maps, deeds, surveys, older projects data, needs of the Project.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Survey's Second task is:
 - Establishing Control (Typically a Network/Group of Controlling Monuments used for collecting data)
 - Utility locate requests for both setting the control monuments and for the entire API of the project for mapping.
 - Owner research and send out Owner Notifications/right of entry letters and door hangers per: ORS 672.047.
- Survey's Third task is:
 - Search for, Recover and Tie(electronically record a position) all Monuments(Property monuments set and recorded on County Surveys and ODOT R/W maps) within the API and any others needed to help Resolve (affix the location of the R/W center line) the R/W of the Highway.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Survey's Fourth task is:
 - Collect and process all the topographic data requested for by the Design Team.
 - The Project Surveyor is working on the resolution of the Highway simultaneously.
 - This involves hours of research, hours of drafting out property lines per deed descriptions, surveys and R/W maps.
 - Then hours of comparisons of record R/W center line data to monuments, roadway, physical features and potential blunders in older data.
 - Once completed and a best fit Resolution of the R/W center line has been established they lay out the Existing R/W lines per the R/W maps and ODOT records.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Survey's Fifth task is:
 - The creation of the Control Recovery and Retracement(CRR) Survey map to be filed with the County PER Oregon Revised Statute 209.155(1)b. This map contains:
 - Control Network.
 - Monuments found.
 - Narrative of Evidence and Decision Making of the Surveyor.
 - R/W widths and location in relationship to the R/W center line.
 - The creation of the Topographic(Topo)Base map showing all the located features within the API.
- Both of these CAD products become the foundation for the Right of Way Engineering(RWE) process.
 - We will reference in the CRR base data for all the property lines and base data needed for RWE process.
 - The Topo will be separately referenced and used to aid in the RWE process



ODOT RIGHT OF WAY ENGINEERING PROCESS

- ODOT has the Right of Way Engineering Manual and posts updates and Bulletins on it's Web site to aide in the creation of the RWE products that the ODOT RW Headquarters needs to acquire the property rights for our projects.
 - These documents are located at the following link:
 - <http://www.oregon.gov/ODOT/ETA/Pages/ROW-Engineering.aspx>



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Survey's Sixth task now moves into the RWE stage:
 - The RWE Surveyor creates a new cad drawing from the SeedRW2d.dgn seed from the ODOT workspace. This is important so that it is a fresh clean and updated drawing.
 - Name the drawing according to ODOT standards.
 - This has changed as of August 1, 2019 after almost 100 years.
 - The new map names will be the Right of Way file No. (RW####M)
 - The RWE Surveyor then requests the RW file No. and official RW project name from the RW agent or looks it up the RITS system.
 - This number will increment into 5 digits eventually.
 - No need to request a map number but you will need to send in a Right of Way Map Information Notification form 734-5221 to Maps and Plans
- <https://www.oregon.gov/ODOT/ETA/Pages/Tools.aspx>.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- The next step is receiving the Design Acceptance Plan's (DAP) footprint from the design team and the team requests maps and descriptions to be created.
- Now the RWE Surveyor needs to determine what size and type of map to create for the project. The size and type of map are determined by the footprint size and location (Urban or Rural).
 - (B Map historic) 24"x >200" is the most common.
 - We now can mix or match printable sizes and have multiple pages for one map.
 - 1"=50' and 1"=100' are most common Scale. We are not limited to this but we need to use judgement and communication to determine the best scale for clarity and other uses of the data.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- With the new RW map format you can mix and match border sizes if needed instead of using inserts etc. Say you are doing a large interchange so you want a 36"X >200" for the mainline but can't quite get the side legs you could use (2) 11"X17" (Pages 2 and 3) for the sides? Or if you have a layout for 18"X24" for the CRR you could use the same layout for the RW map (if enough detail can be legible for acquisitions) the same scale may not work? When doing multiple pages if you create individual PDF's combine them into one PDF for the map to be sent to Maps and Plans.



ODOT RIGHT OF WAY ENGINEERING PROCESS

ALL THE DIFFERENT SIZE BORDER MODELS IN THE ODOT CAD - RW2d seed file.

Type	2D/3D	Name	Description	Design File	Sheet Name
<input checked="" type="checkbox"/>		8.5X11	8.5" by 11" Sheet Border	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		11X17	11" by 17" Sheet Border	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		12X24	12" by 24" Sheet Border	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		18X24	18" by 24" Sheet Border	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		24X200-	24" Wide Roll Map Border	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		36X200-	36" Wide Roll Map Border	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		BLM Plats	BLM Border	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		Default		C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		FS Plats	Forest Service Plat Borders	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		Notes	File Information Page	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		RR Maps	Railroad Encroachment Sheet Border	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		RW Base	Contract Plans existing & proposed RW & property I...	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		RW Design	Working design model for existing and proposed RW	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		Sketches	Sketch Map Borders	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		Survey Approval Map	Highway Design Corridor Resolution	C:\Share\Se...\SeedRW2d.dgn	
<input checked="" type="checkbox"/>		Survey Filing Map Borders	CRR and Monumentation Borders 3 sizes	C:\Share\Se...\SeedRW2d.dgn	



ODOT RIGHT OF WAY ENGINEERING PROCESS

- This process starts by referencing in the CRR base data model into the RW design model of the new seed dgn, then the Topo base model is also referenced in and the logical name “exist” is input into the dialog box, this allows gray scaling of the information when printing by using the RW pen table from the ODOT workspace.
 - NOTE: Many CRR maps are in 1”=100’ and many RWE maps are in 1”=50’ some discretion and manipulation of the information (mostly text orientation or size) may need to be done for creating the new map using the CRR data.
- Next is to go to and set the scale for the map border Model you have chosen. Now the RW Design Model is referenced into the Model at it’s Coordinate correct location and with live nesting enabled.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- The map border cell will be located near 0,0 origin so just zoom to it select and move it to the location of the data.
- Now comes the beginning of the design process. Depending on the orientation of the highway (E-W, N-S) curves (changing directions) through the project, stationing direction (stationing should run L-R) size of the property takes (Urban – small width lots –small take areas or Rural – large property width and large take areas).
 - All these factor into the design scale, rotation of the base data, breaking of the map into sections or pages due to length, curves and rotations.
- After choosing and setting up your map go to the Maps and Plans Web site and notify them of your Map creation using
- form 734-5221.
 - <http://www.oregon.gov/ODOT/ETA/Pages/Tools.aspx>



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Once you have the map all set up return to the RW Design model and start preparing it for the RW design layout. Turn off the Topo reference display.
 - Set the scale of your design model to match your map model.
 - Turn off the all the levels in the referenced CRR except for the ones you want and need in your design like property lines and labels, PLSS lines and labels, RW lines, and existing easements and labels. Basically any of the information that may need modified for the RWE products. Now select and import/copy or (Merge with Master) into the model. Then turn off the reference levels and or reference.
- You will want to re-display the Alignment(s) from InRoads using the RW preference style this will allow you manipulate the data for the RWE application. You don't want to show all the old record information from the CRR in the RWE products.
 - Use your discretion and examples and direction from the RWE Manual.
 - You can also look at previous maps for helpful examples.
 - Use the KISS principle "Keep It Simple Surveyor". Don't overload the map with data if possible.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Next you will want to reference in the Design (Usually from the Roadway Designer) base dgn. This should have all the design elements in it including slope lines (cut/fill), pipes, drainage facilities etc.
 - Work with the Designer to understand the RW needs for the project. They may draft their idea for proposed RW lines and easements based on project discussions and have them identified to aide the RWE Surveyor as to the needs of the project.
- **The RWE Surveyor is responsible for the actual layout, location and design of the new RW.**
- Now you will want to reference in the Map model that you chose.
 - Select the reference clip border(s) from the map and copy into the design model.
 - This gives you reference to the working space of the map including orientation, map breaks and display issues. It also aides in placing text, arrows file numbers etc. correctly.
 - Then you can detach and get ready to start laying out the RW.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- At this point you will want to schedule a RW Layout Meeting to go over the Proposed RW layout with all the stake holders once you're complete.
- Lay out the Proposed RW starting at a point on the Existing RW.
 - There are many methods to use for creating the event points for the layout
 - A preferred method is to use the "Create Cogo Point" command in InRoads.
 - Start by creating points by Station and Offset. Usually a 5000 number point series and a style of "Survey Calc Point".
 - This allows the ability to select a feature (slope line) in the dgn then modify the location of the event point (cogo point) to an Even Station and Offset that works best for the RW layout.
 - These points can easily be modified if something changes.
 - They are reproducible.
 - Gives an exact location to draw lines too.
 - You can run a "Clearance Report" on them for use in the QA/QC process.
 - A "Stakeout" coordinates file can be created for staking and also for Monumentation.
 - Reduces errors.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- When creating the event points try to minimize angle points.
 - Keep Monumenting the RW in mind.
- Try to use existing event points IE: P.C.'s, P.T.'s, and Equation Stations.
 - This cuts down on extra monuments.
- Try to minimize the take areas but keep in mind Maintenance, Staking and Land Value.
- Use the Existing Topo, Geo Referenced Imagery and Street View or Digital Video Log to avoid buildings, utilities and other obstacles.
- Try not to put any event points near property sidelines.
 - You want the calls to extend past the existing property lines so new RW monuments won't be interpreted as private property monuments.
- You will need to communicate with the Region Access Engineer for the project about access control(I.E. Restricted to Highway, None Etc.).



ODOT RIGHT OF WAY ENGINEERING PROCESS

- When your event points are complete you can use a Default or numbered level to draw a perpendicular line between the event points and the center line.
 - This is the alignment for your station and offset text.
 - Extend the lines out past the take areas.
 - Delete the lines or turn them off when complete.
- Place your first text and rotate it facing ahead on the alignment.
 - Now is a good time to edit the text for Masking if you plan to use that and then you can copy and edit ahead as you go.
 - Apply the same to all the RWE text you plan on placing. It saves time.
- If you're confident of the take areas or after the RW layout meeting, you can start creating your area shapes by drawing, copying and trimming the perimeter lines of the file shapes.
 - Make sure and create the complex shapes on the correct shape levels; Fee, PE, and TE. Change the shape colors as shown in the RWE manual.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- When you have all the layout finalized and labeled, you can work on the aesthetics (look and feel) of map and the information in it.
 - Rotate text
 - Move text
 - Mask features and lines
 - Remove or add data
 - Spell check the drawing
 - Look for overlaps and gaps in text and lines
 - Adjust text size
- Check the map and finalize all the notes data and create a PDF print to check the look.
 - You shouldn't need to edit any of the layout data in the map model it should all be set in the design model.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Now your ready to start writing the description and creating the Sketch Maps. Both of these products will go in to the RITS program for the RW agents and Appraisers to use for acquiring the properties.
 - We'll address writing of the description after the sketch maps.
- Go to the Sketch's model in the dgn and set the scale to match the design and map models.
- Reference in the Design model with nesting activated.
- Select and move the Sketch borders cell to near the data and drop the cell.
- Do a copy and replace for all the project information data in the borders.
 - This way when you make copies for each file there will only be a few edits such as file number.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Select your first border, copy and move over File 001.
 - Letter size is the most commonly used.
 - Use the clip border to clip the reference.
 - Each file will have it's own reference.
- Select and copy the File Shapes for File 001 into the drawing.
 - Now turn off the File Shape levels in the reference.
 - This allows only File 001 to have color when plotted using the RW pen table.
- Minimal editing of RWE data should be needed since it was correctly laid out in the RW design model.
 - Sometimes text or data relative to the File may be cut off.
 - Copy the information in and mask out the reference information.
- **It is a good Idea for a consultant or anyone not in the same office to send the first draft to the Region RWE Surveyor for comments and guidance before continuing descriptions and maps.**
 - **This saves having to revise a whole bunch if there is a common error.**
- Continue this process for each file.
 - Some files may need more than one sheet.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- Writing the Legal Descriptions is an ODOT art since it is not a common form of description in the Private sector.
 - Keep the RWE manual close at hand...
 - Always refer to and use the Approved Easement List.
 - Always refer to and use the Deed Recording List.
- Start with a fresh copy of the Description Seed found in the RWE Manual, Section 2 Chapter 1 Page 4.
 - <http://www.oregon.gov/ODOT/ETA/Publications/DescriptionSeedEnglish.docx>
- **It is recommended to Fully create the description and Meta Data (Addendum or RITS data sheet) for File 001 first and send it through the QA/QC process to flush out all the errors and issues before starting on the additional descriptions.**
 - This way all the project data, title, file, center line description, format etc. are correct.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- All final descriptions and maps are reviewed by the Region RWE Surveyor before being uploaded into RITS and the map published to Maps and Plans.
- Now the RWE Surveyor waits.....A statement heard many times is “Now Let the Revisions Begin!”
 - Revision can happen now at any time and for many reasons.
 - Design changes due to many different issues.
 - Owner negotiations for settlement.
 - Legal issues.
- Follow the revision process as outlined in the RWE Manual and the RITS workflow requirements. Once a file passes the approved stage in RW HQ/Rits system and on the OTC agenda it becomes a “Formal Revision”. It needs a “Revision Request document”, explanation and can start the RW process clock over... Consult the Region RWE Surveyor.



ODOT RIGHT OF WAY ENGINEERING PROCESS

- The RWE Surveyor or Manager should have a Monumentation Estimate prepared for the Project Team before Bid Let.
- Once all the acquisitions are closed and recorded the RWE Surveyor needs to “Deed Record” the map per the RWE Manual.
 - Second Note(All on site bid items are complete. Usually the Construction office will notify the RWE Surveyor or Manager) is a good time to do this along with preparing for Monumentation.
 - Make sure and fill in the Revision History.
 - Change the Status Stamp.
- Once Monumentation of the project is complete and the Survey is recorded at the County PER Oregon Revised Statute 209.155(1)b.
 - Add the reference and recording number to the RW map.
 - Plot a new “Final” (RW maps are never really Final) pdf and submit it to the Maps and Plans department for upload into the data base.