Lighting (update 2018)

1. Get roadway plans
   1. Get Khris template for design
      1. Check if design has funding left in project manager toolbox (on intranet)
         1. Go to Highway project info center
         2. Go to SYP project info
         3. Enter item number
         4. Pick D phase and check if any funding is left. If not we do not need to get template.
      2. Send email to Keri Ross for template number. Use PNS2006 to get funding code required.

Ex. 6-415.00

Fund: 12fo

Department: 625

Unit: 3300

Location: 06

Activity: 4260

Function: fd52

sub function: 008

program: 8842201d

* 1. Talk to project manager
     1. Get contact for Roadway Designer (may be consultant) and Utility Coordinator
     2. Get contact for Electrical service (usually from utility coordinator)
        1. Find what quadrant the power is will be supplied from
        2. If overhead (Max. distance that your pole can be from overhead service for drop). Typically all poles should be at least 10 feet horizontally and vertically from the hot wire of the power company.
        3. If underground (requirements for underground –meter, conduit, where service is coming from). May have special requirements from the electric company.
        4. Get minimum distances (Horizontal /vertical) that high mast and conventional poles can be locate near overhead/underground electric.

Typically, all poles should be at least 10 feet horizontally and vertically from the hot wire of the power company.

* 1. Plans can usually be found in ProjectWise under Documents/Projects/district or from the roadway consultant (but don’t count on them being the most up-to-date unless the project manager says so)
* Individual roadway plan sheets for each intersection in Microstation format (.dgn)
* Geometrical layout (Full interchange) in Microstation format (.dgn)
* Propose DTM(or cross sections) and ALG
* Existing DTM if needed
* Proposed utilities plans (dgn preferred or pdf)

1. Make new folder in ProjectWise under Documents/Central Office/Traffic Operations/Branch-Design Services/District/ Lighting
   1. Name folder Item Number + road name(main and cross)+year as main folder
   2. Make secondary folder - Originals
      1. All original roadway plan sheets- geometrical layout
   3. Make secondary folder - Working folder

* Copy roadway plan sheets
* ALL LIGHTING StANDARDS.dgn (under design resources/signals and lighting standard detail sheets/lighting)
  1. Make secondary folder for - Estimates
* (current year) Signal and Lighting Estimate.xls (under design resources/construction cost estimates)
* Project Install Items list (latest date).xls (under design resources/ construction cost estimates), if needed.
* Project release of warehouse material form (latest date).xls (under design resources/ construction cost estimates), if needed.
  1. Make secondary folder for - Documents
* Voltage drop calculator.xls (under design resources)- 120/480 volt, HPS/LED
* Conduit sizing .xls (under design resources)
* AGI file- luminaires2012.AGI (under design resources), high mast HPS only
* AGI file- luminaires2018.AGI (under design resources), LED HM only.
* AGI file- conventional
  1. Make secondary folder for - Inroads
* Proposed DTM(cross sections) and
* Proposed ALG
* Existing DTM
  1. Make secondary folder for utilities plan
* Proposed/existing utilities

1. Get approval letter from Traffic Engineering group for each intersection/interchange (don’t start design until you get the checklists or approval) - you may have to start before the approval is done but it should not be the norm.
   1. Ask the district traffic engineer what type of lighting they want to install if not on approval letter. Get this in writing from the traffic engineer from the district. **THIS IS THEIR DECISION!!!**
      1. Conventional –partial, full, or intersections plus in between
      2. High mast (80 foot 400 watt HPS or LED equal, 100/120 foot 1000 watt HPS or LED equal)
      3. Partial conventional (near houses) and/or partial High mast
      4. Intersection- partial or full (ask if lighting will be installed on state roads on all approaches)
2. Setup field visit for each intersection/interchange with the district traffic engineering and utilities company if lighting is existing/new or the road is existing but being widen

* Located high mast poles locations before the field visit (you may not need to locate conventional poles at this time).
* If road is new construction contact electric company to located which quadrant that the electric will be coming from. You may need two locations for service. it is suggested that you two or more services to avoid long circuit runs or to avoid going under the interstate.

1. Design steps

* Open design file under projectwise in microstation (Always). This makes sure the fonts and cell libraries, pallets are available.
* Pick traffic design workflow task under microstation. This will show pallets and attached cell libraries.
* Reference in all dgn’s to piece together interchange or intersection. (Geometricial layout may help). Make sure that you always have the originals available to reference back in if needed. Make sure that you merge all the references into one file.
* Clean up design plan (you can delete all items not needed or can turn off layers not needed). You will need all roadway inside all tapers for the mainline and the side street. You also will need any drainage/bridge structures, right-a-way fence, any overhead/underground utilities that may be a problem. You may want to do a save as before you start deleting things so that you can go back and add anything back if delete by accident.
* The cleanup file needs to be convert to a DWG/DXF file so that it can be imported into AGI 32. Name lighting layout for AGI.
* Leave original microstation file open for reference when you open AGI 32.
* Open AGI 32- luminaires2012.AGI (for high mast only)- luminaires2018.AGI (for LED high mast only)- conventional open new one
  + for high mast use 4 to 6 luminaires per pole, always start with 120 degree shields with the shields through the right-a-way fence. If uniformity/average high, you can use less luminaires per pole but not suggested.
  + For LED high mast it is suggested you use AW (type 5) with shields, you can also use N (type II)/M (type III), but I warn you on using these types because may develop hot spots and can mess up uniformity ratio. If use N/M, move poles locations further away from the road. 1000 watt equal use pk3 for 100/120 foor poles and p2(400 watt equal) for 80 foot poles. All data above is subject to change per new LED products.
  + (For conventional use type II luminaire with 250 watt on mainline and 150 watt on ramps)(Intersection use 250 watt)(if center barrier wall use 400 watt long and narrow pattern- single luminaire mounted on c bracket)
  + For LED conventional, type II luminaires, 250 watt hps equal use autobahn 60b with 800ma/700 ma driver, 150 watt hps equal use autobahn 30b with 800ma/700ma driver, 100 watt hps equal use autobahn 20b with 800ma/700ma driver, 400 watt hps equal use autobahn 80b with 800ma/700ma driver. All data above is subject to change per new LED products.
* Import converted into AGI 32 “File Import Dwg/DXF”. Remember you can add other DWG/DXF if needed to add details. Sometimes it is easier to do things in microstation instead of AGI32.
* Go to advance options under import cad file and make curve increment smaller- this will help the curved lines look smoother.
* If conventional lighting, you may have to add Luminaire IES file. The IES files for the high mast should already be in the luminaires2012.AGI or luminaires2018.AGI files.
* Make sure that when you add luminaires that you enter the right LLF for the HPS or LED.
  + HPS values are in the traffic policy manual (LLF: close-.65, open-.80).
  + LED values calculated per the following:
    - The Light Loss Factor (LLF) shall be calculated for each fixture as follows:

LLF = LLD X LDD

Lamp Lumen Depreciation Factor (LLD) shall be the specified percentage of LED lumen maintenance at 70,000 hours at 25°C (77°F) from the TM-21 report. This LLD should be according to LM -80 and TM -21 reports. This report shall be submit for verification.

Luminaire Dirt Depreciation (LDD)= .9

* Need to add 3D calculations points for the entire roadway that needs to be light (only for interchanges)-use 2D when intersections and conventional lighting design only.
  + All calculation points should be placed on the roadway at the evaluation that is actually out there. (USE calculation points on a line for this)
  + Need to find the lowest point for the whole intersection/interchange and make your 0 point. (From Proposed DTM)- all others points will be + or – this 0 point.
  + The line for calculations points should be place in a array for one direction or both directions if needed-set number of array lines and array spacing- take roadway width divided by 4 to get array spacing
  + The line calculations will be for ramps (may be wider at the top of ramps), mainline (may use both direction array), and approaches. Note that all evaluation changes will be entered in on the bottom right hand of AGI32.
  + Use statistical areas to get full interchange statistics- you can use individual statistical areas for areas that are important.
  + You may add solids to block light if needed in the design
* Locate poles for high mast (need to be inside R/W, outside clearzone (reference roadway design guide table 3-1)
  + If poles are near overhead utilities, the pole location shall be far enough away from utility pole/lines per the rules from the utility company.
  + Usually place poles 30 foot off the ramp or mainline or side street. You may want to place further off the roadway if using N/M type LED luminaires.
  + If guardrail, place poles 4 feet behind guardrail. You may need original design plan to see guardrail because it will just be a line in AGI 32 after conversion.
  + Usually a 6 luminaire pole can be spaced about 490 feet apart. It may be a little less for LED luminaires.
  + Remember that individual luminaires can be rotated if needed. In AGI 32 the luminaire group will have to be exploded and each luminaire will have to be rotated. To get an actual template, you will have to group the luminaires back together to get the correct template. When you re-group you will need to draw lines to get the center point of the luminaires to center the luminaire on the re-group.
  + Place poles in areas that a digger truck can install them. This also will be good when we maintenance them in the future. Check with roadway designer to verify locations for accessibility.
  + Remember that each pole needs to be place at the correct evaluation according to the 0 point. You can export to DWG/DXF to verify the evaluations in your original DGN. You may have to reposition the DWG after referencing into original DGN (check everytime or use same file name and reload when changed).
  + All high mast poles need to be numbered (HM#). You may want to renumber the poles after final for ease of locating poles. This is done under project manager under entity type luminaires (use right click).
* Locate poles for conventional and intersections (conventional poles can be in clearzone but will be breakaway). Remember that when places poles without arm length that the symbol is the actual luminaire not pole/luminaire. If you designate an arm length, make sure that you know the minimum arm length per the manufacturer when designating the arm length (this way is not suggested).
  + If poles are near overhead utilities, the pole location shall be far enough away from utility pole/lines per the rules from the utility company.
  + Usually poles (this is for breakway) will be place 1 foot behind the paved shoulder.
  + If behind a guardrail, the poles will be place 4 feet from face of rail.
  + Usually luminaires will be place on the right most edge of the road. Remember that the luminaire arm cannot be more than 15 feet (40 only). 30 foot is not more than 12 feet.
  + In gorge areas/top of intersection in interchange, luminaire heads may have to place on the road to get correct lighting.
  + If on barrier wall, the transformer base will not be installed. (there should be a junction box built into the wall.)
  + All poles should be perpendicular to the road or curve.
  + Avoid placing pole in the lower gorge area if possible.
  + If poles are placed on bridges, the designer needs to talk to bridge designer to get outriggers designed.
* The overall statistical zone should be .80 FT Candles average/.20 ft candles min./4:1 uniformity ratio(average to min). If intersection, the overall statistical zone should be according to the requirement set in the policy manual.
* Please make sure that you save the AGI 32 file every time it asks and maybe after you do several placements/calc zones. It crushes sometimes.
* Export the final AGI design in DWG format (2000). Keep AGI 32 open for now.
* If microstation not open, reopen it. Reference the AGI DWG into original clean-up file. You will have to make sure that the dwg lays over the original right. (Most of the time it does not)
* Check clearzone(30 foot) for all poles and check if all poles are 4 foot behind guardrail.
* Check if the poles are placed in areas that a digger truck can installed them.
* Check on google maps and see if poles have any problems with drainage/bridge structures or trees. Check if the poles are in ditches.
* May want to send location to utility agent in district if close to existing or proposed utility. You also may want to send to project manager to see if he/she is ok with the locations.
* From the traffic design workflow task, you will need to place the cell for the type of high mast or conventional that you are using. Remember high mast has different cells for each number of luminaires and types. These may need to be scaled up so they can be seen on a half size plan sheet (12x18). When you place the cell for the type of luminaire make sure that you do the orientation of the luminaire. High mast may have several different directions. Use the single arrow under the high mast cell task to add another direction.
* You need to locate the service location(s). You may need more than one.
* Place the cell from the traffic design workflow task for the base-mounted or pole mounted service. You will need a wood pole cell for both. The pole-mounted cabinet will be attached to the wood pole. The base-mounted will be separate from the wood pole. (The use of base mounted is preferred)

High mast only:

* + At this point you need to use the ducted cable line type to start routing the ducted cable. Use place point or steam curve (under linear elements classic) for the drawing of the line because ducted usually does not like sharp angles so it should be a curve when routing it. Usually place a line/curve for each ducted cable that will be in that trench. Remember that all ducted cable routes should be splice free.
  + If crossing the road, you will use the 3” rigid steel conduit line style. Usually place a line for each conduit that will be in that bore under the road. There will be a spare placed if going across the mainline or cross street not ramps. There will be a 3” conduit for each ducted cable crossing the road.
  + There will be a junction box place on each side of the conduit bore/bridge. Conduit bore should be on a 45 degree angle between the junction boxes. Use JB C if more than 3 ducted cable going through it otherwise use JB A. make sure that you scale(4x) up all junction boxes so that you can see them on the 18x12 sheet of paper. If just going to one pole that is close to road (behind guardrail), conduit may go straight to the pole. All jb’s need to be numbered.
  + If duct goes through bridge, the actual duct may have to be removed to get it through the conduit in the bridge. This ducted cable still should be splice free. You may have to have more than one ducted cable going through the conduit if going across a bridge. Need to work with the bridge designers about the transition from the bridge deck to the ground. This transition should not be located near the guardrail installation at the end of the bridge because it may be damage by the guardrail installation. You can also add conduits to the outside of existing bridge wall. Use 3” conduit for each ducted cable and use rigid flex for transitions. Remember that the conduits straps shall be every 4 foot on center and should be two strap type.
  + Need to add markers every 300 feet and at each turn or at placed where the ducted cable branches off from the main trench for the cable. Scale markers up so that you can see them on a half size sheet. All markers need to be numbered.
  + Leave microstation open , and then open voltage drop calculator so that you can get the voltage drop for each highmast pole. In excel spreadsheet make should that you copy the tab at the bottom and rename it for each highmast pole. This can be used later if changes to circuits.
    - Measure the distance from the service to each high mast pole. You may want to add text for each route so that you can do quantities later on. Separate out conduit crossing so that you do not have to measure again.
    - Add number of luminaires
    - Add height of pole(either 80, 100, or 120)
    - Change wire size so until the voltage drop in less than 5%.
    - The spreadsheet only does 480 volt and only wire size up to #1 AWG.
    - This is two wire system. All ducted cables will have 3 wires :hot, hot, ground.
  + Add service note (Cell: note\_hm\_480) near service locations and place a leader on it. number each service location.
  + Add circuit note (cell: note\_hm\_circuits) and fill out all info for ducted cables (these are data fields). This will be use to copy/paste along all the ducted cables routes. This note should be use until you get to each pole but the circuits will be delete as you go through the high mast poles. Place leader on each note. Note that this note is data field type cell and if outside the border it may delete the note when you do e-sheets.
  + Add Conduit note (cell:note\_hm\_cond) for all conduit crossing. This note should include how many conduits and spares. Place a leader on each note.
  + Each high mast pole should have a station and an offset (or Northing/eastern). This can be near pole with leader or in a chart. Make sure that you add the alignment file name for each station.
  + Add note for wiring (cell: leg\_hm\_sch). Fill-in data fields.
  + Add note hm schedule (cell:leg\_hm\_info). Fill-in data fields.
  + Add north arrow
  + Add lighting legend from cell library and modify. Remember that it is good idea to re-group for movement.
  + Add cell leg\_hm\_3. You may need to fix arrow in legend.

Conventional only

* + At this point, you need to use the conduit line styles to start routing of the wire or use ducted cable line style.
    - Conduct: It is usually 1 ¼” PVC conduit between all poles and 2” rigid steel conduit under roads or 2” PVC not under roads. Need to check the 40 % fill for each wire run with conduit sizing.xls spreadsheet. Usually place a line for each conduit that will be in that bore under the road. There will be a spare placed if going across the mainline or cross street not ramps. Remember that all wiring routes should be splice free. You may need a doubleback for the wire in short distance and the conduit may need to make larger. Splices are allowable but they will need to be note on the plan sheet and should be above ground in transformer base or structure. There should be only one splice in each wire route but avoid if can.
    - Ducted Cable: At this point, you need to use the ducted cable line type to start routing the ducted cable. Use place point or steam curve (under linear elements classic) for the drawing of the line because ducted usually does not like sharp angles so it should be a curve when routing it. Usually place a line/curve for each ducted cable that will be in that trench. Remember that all ducted cable routes should be splice free. If crossing the road, you will use the 3” rigid steel conduit line style. Usually place a line for each conduit that will be in that bore under the road. There will be a spare placed if going across the mainline or cross street not ramps. There will be a 3” conduit for each ducted cable crossing the road. There will be a special note added for transitions into the conventional pole base, which will give the contractor options. Need to add markers every 300 feet and at each turn or at placed where the ducted cable branches off from the main trench for the cable. Scale markers up so that you can see them on a half size sheet. All markers need to be numbered.
  + There will be a junction box place on each side of the conduit bore/bridge. Conduit bore should be on a 45 degree angle between the junction boxes. Use JB C if more than 3 conduits going through it otherwise use JB A. make sure that you scale (4x) up all junction boxes so that you can see them on the 18x12 sheet of paper. All jb’s need to be numbered.
    - Ducted Cable: If duct goes through bridge, the actual duct may have to be remove to get it through the conduit in the bridge. This ducted cable still should be splice free. You may have to have more than one ducted cable going through the conduit if going across a bridge. Need to work with the bridge designers about the transition from the bridge deck to the ground. This transition should not be located near the guardrail installation at the end of the bridge because it may be damage by the guardrail installation. You can also add conduits to the outside of existing bridge wall. Use 3” conduit for each ducted cable and use rigid flex for transitions. Remember that the conduits straps shall be every 4 foot on center and should be two straps type.
  + Leave microstation open, and then open voltage drop calculator so that you can get the voltage drop for each circuit. In excel spreadsheet make should that you copy the tab at the bottom and rename it for each circuit. Usually 20 poles at 250 watt per circuit.
    - Measure the distance from the service to each pole and in-between them. You may want to add text for each route so that you can do quantities later on. Separate out conduit crossing so that you do not have to measure again.
    - Add distance between pole
    - Add height of pole (either 30 or 40) include arm length.
    - Change wire size so until the voltage drop in less than 5%.
    - The spreadsheet only does 480 volt and only wire size up to #1 AWG.
    - This is two wire system. There will have three wires: hot, hot, ground.
    - When deleting luminaires from spreadsheet make sure that you clear not delete columns.
    - Usually use same wire for whole circuit route.
  + Add service note (Cell: note\_hm\_480) near service locations and place a leader on it. Number each service location.
  + Add wiring note in a chart. This should show the route of the wire include doublebacks of the wire.
  + Add Conduit note (cell:note\_hm\_cond) for all conduit crossing. This note should include how many conduits and spares. Place a leader on each note. This can be in chart form too and may include conduit between each pole
  + Each conventional pole should have a station and an offset or northing/easting. This can be near pole with leader or in a chart. Make sure that you add the alignment file name for each station.
  + Add cell: NOTE\_CL\_PR and cell: NOTE\_GEN\_CL
  + Add north arrow
  + Add lighting legend from cell library and modify. Regroup for ease for movement.
  + Add any notes for doublebacks or areas where splices are. All splices should be note.
* Place cell sheet SP from the KTYCsheet.cel library for border. All design and notes shall be in this border. If interchange does not fit in 100 scale, you may need to have matchlines and fit on sheet. Do not drop Cell!!
* Leave street names for all approaches.
* Enter a description into the bottom right of the SP sheet: EX. lighting plan for (Main) @ (Cross)
* Enter County, Item number, Sheet number in top right of SP sheet.
* Enter cadd standard sheet name in bottom left of SP sheet.

1. Leave individual plan sheets open and do estimate

* (latest date) Signal and Lighting Estimate.xls (under design resources/construction cost estimates)
* Pick lighting tab at the bottom
* Remove all items that are not required for the lighting(s)
  + Use bore and jack or/and trenching and backfilling if new pavement or area that bore and jack can be done.
* There should be as individual column of quantities for each signal in the plan set. There should be a final total column included.
  + Trenching and backfilling will be only one length if several ducted cable or conduits are not under the roadway
  + If under roadway do length of each conduit and use bore and jack bid item.
* Fill out all items at the top of the estimate spreadsheet (enter project numbers)
* If needed, Open Project install items.xls (under design resources/ construction cost estimates)
  + Fill out install list and remove items that you are not using
  + Open Project release of warehouse material form (latest date).xls (under design resources/ construction cost estimates) and copy all install items on this the new project release sheet. Do not includes the prices or final costs.
  + Open internet explorer to PNS 2006; http://kytcintra/PNS/ ; click on programs under construction; under search choice SYP Number; type item number in for blank space ex. Item number 3-317.00 type 030031700; after that fill out top portion of install list. If project construction program number is not available, use the design program code and remove the “D” on the end of it and replace with “C”. If no design program number is available, do not fill these items out.

1. Open ALL Lighting Standards.dgn.

* Add each plan sheet for each intersection/interchange as a model. Rename each model to: Lighting plan for Main @ Cross.
* Delete the standard details that will not be used in this project under models.
* Add copies of the service standard if more than one service location. Each service location sheet will need to be modify for the number of circuits and the size of the contactor/main breaker. Branch breakers should be 20 amp but need to be checked for each circuit current output. Usually contactor/main breaker is equal to the total amount for the branch breakers. There is always one space. Use pole mount service if under 5 circuits, otherwise use base mounted service. if more than 10 circuits may have to have another service.
* Renumber models so that you can number each sheet cell (Ex T1- ). They should be number according to current standards.doc (under design sources/signal and lighting standard detail sheets). Make sure to check with project manager to make sure that there are no signing plans in the project because this may change your starting number for your T sheets.
* Each sheet cell for each detail and plan sheet shall have county, item number, sheet number, and esheet name. for esheet name (EX T00100SU) see cadd standards or current standards.doc
* Make sure that you fill-in the bottom right hand data fields on the plan sheets for the Lighting with the main street/cross street- should read “Lighting plan for (Main) @ (cross)”
* On first sheet (Quantities/bid notes) add project numbers, date submitted, design by in right hand corner; cell stpl from sheet cell library.
* Remove all references and rasters from each model.
* Leave dgn open, under file update file to the server.

1. Final plans turn In

* Open projectwise- export (all lighting standards.dgn) to a folder on your desktop
* Follow instructions for sheets under design resources folder – TO USE ESHEETS.docx
* Check that after sheeting that you have all the files that you need.
  + You may have to check if the fill is on because some will not show on the pdf.
  + If the fill is not on, the individual sheet may have to be undone.
  + Use Print/plot do individual pdf for the sheets that are wrong.
* Move esheet folder from desktop to ProjectWise folder under Documents/Central Office/Traffic Operations/Branch-Design Services/District/ Lighting- see 2a
* Also move esheet folder on desktop to projectwise folder under Documents/Projects/District/item number/contract plans and proposal/contract plan set/traffic/ Lighting
* Also move final estimate and project install items/project recommendation to projectwise folder under Documents/Projects/District/item number/contract plans and proposal/miscellaneous
* Email Bill Greene and project manager that all the plans and estimates have been added to the projectwise folders. May want to add link
* Email Project Release sheet in PDF format to Scott tingle and ask him to add to proposal for the project (if needed).
* Email Project install items to Kerry Roberts, Kim Stamper, and Jason Lambert (if needed)
* Email Estimate and Project install Items to Travis Jones or Lindsey Carter or Ivan Childers.

1. FAA and KAZC permits
   1. Open blank Excel Spreadsheet
      1. Add columns for Northing, easting, LAT, Long, elevation coordinates from Mircostation for each signal pole.
      2. Northing and easting coordinates only convert into LAT/LONG deg,min,sec (ex. Remove the degrees, minutes, and secs symbols, 38 12 12.123 -85 34 23.12 (add negative sign)). You can use <http://kgs.uky.edu/kgsweb/CoordConversionTool.asp> to convert. Check if coordinates are close enough to location by bringing up the map on this website.
      3. Email excel spreadsheet to John Houlihan (john.houlihan@ky.gov) at KAZC to see if we need to apply for a permit.
         1. If his response is a no, you need to keep email for the records and complete the following:
            1. Input all locations in to the FAA Notice criteria tool, <https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm>
            2. Add column to spreadsheet to note if the tool requires a FAA permit.
            3. If the tool requires permit,
            4. Does the map on the screen show a heliport? FAA has jurisdiction over all private and public heliports. KAZC only has jurisdiction over public heliports (Kentucky has no public heliports). A heliport will look like a perfect circle on the map. Usually the airport will have an eclipse and an approach block.

If yes you will need to file for a permit for all locations. Go to step e.

If no you will need to document that you do not see a heliport surface. Then you would need to document (with photos and added to file) if location fits within the 77.9 e 1 requirements to not file a permit:

(e) You do not need to file notice for construction or alteration of: (1) Any object that will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation; You are done.

* + - * 1. You will need to get a login ID and fill out a permit for each location. Make sure that you make KYTC the sponsor and add Ted Swansegar as the contact for the Sponsor.
        2. You may be required by the FAA to update or modify your information that has been turned in on the permit.
        3. FAA also will require you to turn in a PART 2 submittal after the structure is installed. If the structure is moved in the field, a new permit shall be submitted to the FAA. You will need to terminate the existing location permit.
      1. If his response is a yes, you will need to do the following;
         1. Get and fill out the permit application (TC 55-2) from the website. <http://transportation.ky.gov/Aviation/Pages/Zoning-Commission.aspx>
         2. On this permit just fill out one location and add in comments that there are multiple locations. You will need to attach the spreadsheet to your submittal
         3. Send permit to John Houlihan to process and he will send to the KAZC commission for review.
         4. There may be follow-up after the structure is installed.
         5. Input all locations in to the FAA Notice criteria tool, <https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm>
         6. Add column to spreadsheet to note if the tool requires a FAA permit.
         7. If the tool requires permit, you will need to get a login ID and fill out a permit for each location. Make sure that you make KYTC the sponsor and add Ted Swansegar as the contact for the Sponsor.
         8. You may be required by the FAA to update or modify your information that has been turned in on the permit.
         9. FAA also will require you to turn in a PART 2 submittal after the structure is installed. If the structure is moved in the field, a new permit shall be submitted to the FAA. You will need to terminate the existing location permit.

1. **Take a Nap!!**