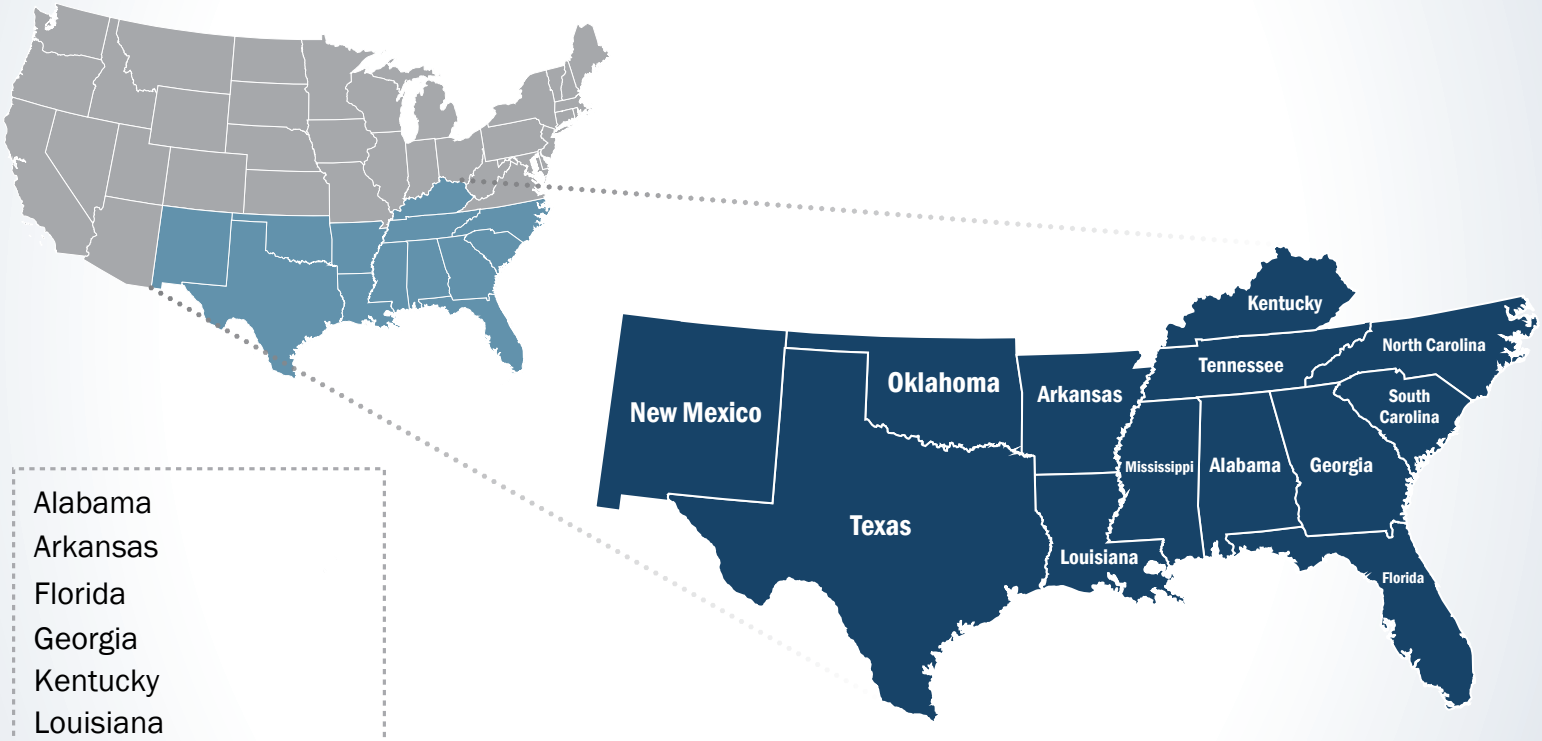
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Nationwide Public Safety Broadband Network

Final Programmatic Environmental Impact Statement for the Southern United States

VOLUME 14 - CHAPTERS 16-22 & APPENDICES



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Cooperating Agencies
Federal Communications Commission
General Services Administration
U.S. Department of Agriculture—Rural Utilities Service
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First Responder Network Authority



Nationwide Public Safety Broadband Network

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VOLUME 14 - CHAPTER 16

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16. BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

This chapter provides examples of best management practices (BMPs) and mitigation measures that FirstNet and/or their partners would recommend or require to be implemented during deployment and operation of the Proposed Action to help avoid or minimize potential impacts to various resources, or potential impacts to deployed infrastructure from various hazards. Specifically, FirstNet and/or their partners would be required to implement mitigation measures, as defined through permitting and/or consultation with appropriate resource agencies. Unlike mitigation measures, however, BMPs would not necessarily be required in every project activity but would be applied as practicable or feasible during deployment and operation of the Proposed Action. The BMPs and mitigation measures outlined in this chapter have been developed based on consultation with other agencies as well as through independent research conducted by FirstNet and their environmental contractors. It is possible that other or additional site-specific BMPs and mitigation measures not included in this chapter may be recommended or required to be implemented as a result of consultation with resource agencies, permits, and/or additional environmental reviews.

16.1. INFRASTRUCTURE

16.1.1. BMPs and Mitigation Measures for All Project Types

This section describes BMPs and mitigation measures to address potential impacts to infrastructure resources. Based on the analyses of proposed activities in Chapters 3 to 15, the potential activities associated with the deployment and operation of the Proposed Action and alternatives are expected to have less than significant impacts. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for construction on or near public roads;
- Follow all applicable federal, state, and local laws concerning traffic speed and safety during the transport of equipment;
- Avoid roads with heavy traffic volumes and during peak travel hours, to the extent possible, when scheduling the transport of heavy equipment or construction materials;
- Schedule deployment activities outside of peak traffic hours;
- Design staging areas to minimize unnecessary equipment and material mobilizations;
- Repave and restore disturbed roads and public road rights-of-way (ROWs), in accordance with federal, state, and local laws, as quickly as possible so as to not create any traffic impediments that hinder access to local public safety and emergency facilities and to allow traffic capacity and safety conditions to return to their pre-construction condition;
- Design new deployment activities within ROWs, to the extent possible, and outside of roadways and thoroughfares to minimize potential impacts on traffic flow or safety;

- Coordinate closely with public safety officials, emergency and medical facilities, and existing telecommunications providers so that each is aware of the deployment activities and schedule;
- Schedule new construction outside of seasons known to cause more accidents (e.g., hurricane or winter storm seasons or times of the year when wildfires are more likely to occur) so that potential service disruptions are less likely to coincide with times of increased demand;
- Confirm or otherwise install detection systems so that if and when a disruption to utility services or telecommunications systems occurs, it is identified and can be repaired quickly;
- Implement a backup telecommunications system, as needed and feasible, which allows first responders to communicate during deployment activities until the new NPSBN has been successfully implemented;
- Complete deployment activities as quickly and safely as possible to avoid any possible disruptions to utility services;
- Complete deployment activities that could interrupt power during non-peak times to minimize disruption of service;
- Follow all applicable federal, state, or local requirements regarding utilities (water, sewer, power, and electricity) and construction within a utility ROW as to not exceed any acceptable limits; and
- Follow all applicable state and local one-call[1] laws and procedures for buildouts.

16.1.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

16.2. SOILS

16.2.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include potential construction-related impacts to soil resources resulting from ground disturbance activities. Based on the analyses in Chapters 3 to 15, potential impacts from the proposed activities would be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all applicable federal, state and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize erosion and sedimentation and restore disturbed soil;
- Minimize soil disturbance to the extent practicable;[2]

[1] "One call" refers to the use of a single phone call to notify the utilities in the area of impending excavation activities. Often the utilities will go to the site and mark their lines (either with flags or paint) so that the excavation can avoid, if possible, damaging the utility equipment or disrupting service.
[2] See Section 9.5, Wetlands, for a discussion of BMPs and mitigation measures in wetlands.

- Avoid construction in areas with steep (greater than 20 percent) or unstable slopes with soils known to be particularly susceptible to soil erosion and construct facilities in alternate locations if practical;
- Develop a soil erosion and sedimentation control plan for disturbed areas, including the use of silt fences, fiber rolls, gravel bag berms, erosion control blankets,[3] retention ponds, straw and sandbag barriers, and/or other controls as needed to reduce soil erosion, storm water runoff, and sedimentation;
- Minimize the area of bare soil at any one time as much as possible by constructing in stages;
- Revegetate disturbed areas, with native plants to the extent practicable, as progressively and quickly as practicable to achieve stabilization;[4]
- For areas requiring plowing, remove and store topsoil with a woven weed barrier or similar material for post-construction site restoration;
- Cover exposed areas with tarps or similar materials to prevent exposure;
- Vehicles should stay on existing roads or previously disturbed areas to the maximum extent practicable;
- Use deep tillage procedures where practical to loosen compacted soils;
- Restore soil surface to original or improved contours;
- Use timber mats or similar infrastructure, as deemed necessary, to distribute vehicle and heavy equipment weight;
- Minimize soil disturbance to the extent practicable, especially in wetland and designated natural resource areas;
- Maintain topsoil by segregating topsoil or surface soil from subsurface layers and implementing temporary topsoil storage areas during construction;[5]
- Replace topsoil as soon as possible following construction;
- Use existing roads or previously disturbed areas to the maximum extent practicable;
- Avoid construction activities resulting in soil disturbance during periods or months with heavy rainfall and snowmelt,[6] to the extent possible; and
- Pay particular attention to areas identified as having soils that are vulnerable to compaction (see Affected Environment Soils sections) and select alternate locations to construct facilities if practical.

16.2.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for soils beyond those listed above for all project types.

[3] Silt fences are designed to trap sediment in the area where construction or soil disturbance is taking place to minimize or avoid soil erosion and sedimentation. They are often 2 to 3 feet tall and are buried 8 to 12 inches into the soil with stakes. Erosion control blankets are biodegradable or synthetic sheet-like materials that are rolled out onto disturbed areas to protect soil form wind and water erosion.
[4] Plant roots play a significant role in stabilizing soils. Seeding disturbed areas quickly after construction activities would allow for faster plant and root development and would therefore provide better erosion protection.
[5] Topsoil is segregated from subsoil layers by stripping the uppermost soil from the area being excavated and storing it separately from the subsurface soil. Once construction is completed, the topsoil is replaced as the uppermost soil unit.
[6] See Affected Environment Climate Change sections for an explanation of seasonal climate and weather patterns.

16.3. GEOLOGY

16.3.1. BMPs and Mitigation Measures for All Project Types

Environmental concerns regarding geology can be viewed as two distinct types, those that would potentially result in impacts to the project, such as seismic hazards, landslides, and volcanic activity, and those that would potentially be impacts from the project, such as land subsidence, mineral and fossil fuel resources, paleontological resources, and impacts to resources such as surface geology, bedrock, topography, physiography, and geomorphology. Based on the analyses in Chapters 3 to 15, impacts associated with deployment or operational activities are anticipated to have less than significant impacts to geology. For those areas with the potential to encounter geologic hazards, FirstNet and/or its partners would require, as practicable or feasible, the BMPs and mitigation measures listed below, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for construction codes, seismic criteria, and geotechnical designs;
- Locate construction/deployment activities outside of high risk seismic hazard zones, active faults, and away from low coastal areas;
- Avoid construction in seismically active areas, locations with karst topography or that have shown recent subsidence, or steep or unstable slopes that are susceptible to erosion; construct facilities in alternate locations if practical;
- Avoid, to the extent practicable, deployment in areas that undergo significant geomorphological changes, such as within streams and rivers;
- Design and deploy resilient infrastructure to withstand earthquakes typical to the region;
- Construct all infrastructure to standards that meet or exceed state seismic requirements;
- Consider alternate methods to trenching for placement of fiber optic cable and transmission lines in sensitive areas;
- Locate construction/deployment activities away from steep slopes with unconsolidated material and other areas prone to landslides, to the extent practicable; and
- Locate construction/deployment activities outside of areas identified as having karst topography, loosely compacted soils, and low-density sediments prone to subsidence or compaction, to the extent practicable.

For those areas with the potential to encounter mineral or fossil fuel resources, or paleontological resources, or impact surface geology, bedrock, topography, physiography, and geomorphology, FirstNet and/or its partners would require, as practicable or feasible, the BMPs and mitigation measures listed below, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for mineral, fossil fuel, and paleontological resources;
- Avoid rock ripping to the extent practicable to preserve bedrock resources, topography, and physiography;
- Minimize the area/volume of disturbed/removed terrain during deployment/construction;
- Avoid areas with significant fossil resources, if practicable;

- Monitor deployment/construction activities and salvage fossils if areas with significant fossil resources cannot be avoided, to the extent practicable and in accordance with applicable laws and regulations;
- If paleontological resources are encountered on a project construction site, suspend all work until a certified paleontologist has been brought on-site to oversee project activities and ensure that fossil resources are handled properly;
- Limit construction to areas that are not actively mined or undergoing mineral or other material or petroleum extraction activities, or coordinate deployment with mining and extraction activities (both existing and planned) in active areas;
- Restore topographic features and grades to pre-construction/deployment conditions; and
- Develop a Paleontological Monitoring and Mitigation Plan outlining areas with high likelihood for encountering significant fossil resources and plans for avoidance and appropriate response if previously unknown resources are encountered.

16.3.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for geology beyond those listed above for all project types.

16.4. WATER RESOURCES

16.4.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include potential deployment-and operation-related impacts to water resources resulting from ground disturbance activities, such as an increase in erosion or sedimentation near construction and staging areas. Based on the analyses in Chapters 3 to 15, potential impacts to water resources from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Minimize ground disturbance in or near waterbodies during construction, as practicable, particularly in areas prone to erosion;
- Follow all applicable federal, state, and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize introduction of eroded materials into waterbodies;
- Development of a storm water pollution prevention plan (SWPPP);
- Include engineered or site designed methods to control storm water;
- For large-scale construction activities, implement storm water reduction methods, including minimizing impervious surfaces, using porous materials, or collecting and reusing storm water (e.g., extended detention ponds, storm water wetlands, filtration structures,[7] and infiltration (or recharge) basins);[8]

[7] Storm water filtration structures use a filtering media (sand, soil, gravel, peat, or compost) to remove pollutants from storm water runoff.
[8] Infiltration basins (also known as recharge basins) are considered a treatment BMP because they can remove pollutants from surface discharges by capturing the storm water runoff volume (typically, larger volumes than an infiltration trench) and infiltrating it directly to the soil rather than discharging it to an aboveground drainage system.

- For large-scale construction activities, direct water to storm water drains, or to constructed bioretention,[9] rain garden, or other storage and retention areas designed to slow water and allow sediments to settle out;
- Minimize the total area of bare soil at any one time as much as possible by constructing in stages;
- Minimize clearing of riparian and streamside vegetation, including trees, as practicable;
- Establish and clearly mark all waterbody buffers in the field with signs or highly visible flagging until construction-related ground disturbing activities are complete;
- Stabilize and revegetate disturbed areas as progressively and quickly as practicable;
- Avoid construction of roads and other impervious surfaces in floodplain areas to the extent practicable, and where necessary in floodplains, construct roads and other impervious surfaces level with existing grades, as practicable, to not change or restrict water flow;
- Station all deployables and above ground structures outside of the 100-year floodplain, to the extent practicable. If deployables or above ground structures must be placed in 100-year floodplains, station them such that they are not vulnerable to be damaged by flood flows and do not themselves impede or restrict flood flows, as practicable;
- Restore native vegetation/wetlands to stabilize streambanks and stop erosion;
- If using directional bores to cross a stream, the length of the bore should include any forested riparian areas along the stream to minimize impacts to forested habitat;
- The cleared width through any forested area should be the minimum needed to install the line and no more than 20 feet wide through the forested area to allow the canopy to close over the line;
- Restore disturbed streambanks using bioengineering bank stabilization methods and revegetate disturbed banks with native trees, shrubs, and herbaceous plants;
- Ensure any development proposed in a floodway or floodplain meets or exceeds state or local regulations;
- Avoid construction, where feasible, in areas with steep or unstable slopes with soils known to be particularly susceptible to soil erosion and construct facilities in alternate locations if practical;
- Develop a soil erosion and sedimentation control plan for disturbed areas, and implement BMPs, as appropriate, including the use of silt fences, erosion control blankets, and other controls as needed to reduce soil erosion, storm water runoff, and sedimentation;
- Avoid construction activities (especially activities resulting in soil disturbance), to the extent possible, during rainy or snowmelt seasons when streamflow, rainfall, and runoff are highest;
- Monitor site restoration following ground disturbance activities, as required by law or permit; implement contingency measures if site restoration should fail and soil erosion occurs;
- Retain vegetative buffers, wherever possible, to prevent runoff into waterbodies;
- Minimize in-stream work to the extent practicable, and when working in streams, restore streambeds and banks to original contours;

[9] Bioretention is a structural storm water control measure that captures and temporarily stores storm water runoff using soils and vegetation in shallow basins or landscaped areas to provide enhanced removal of dissolved storm water pollutants, including nutrients, pesticides, organics, metals, and biological constituents.

- Minimize the use of riprap and the use of alternative erosion protection materials whenever possible;
- Where riprap must be used, place only enough riprap to provide stream bank toe protection, such as from the toe of the bank, and consider using bioengineered bank stabilization methods instead of riprap;
- Seed and protect disturbed stream banks that are 3:1 or steeper with heavy-duty net-free biodegradable erosion control blankets to minimize the entrapment and snaring of small wildlife such as snakes and turtles (follow manufacturer's recommendation for installation); seed and apply mulch on all other disturbed areas;
- Construct all stream crossings (roads and trenching) as close as perpendicular to the axis of the waterbody channel as engineering and routing conditions permit;
- Use standard upland construction techniques when crossing of waterbodies when they are dry or frozen and not flowing or as required by permit or law, provided that it is not likely for flow to resume during construction and prior to post-construction stabilization;
- Route the stream crossing to minimize the number of waterbody crossings where waterbodies meander or have multiple channels, as practicable;
- Inspect and maintain tanks and equipment containing oil, fuel, or chemicals for drips or leaks to prevent spills to the ground or directly into waterbodies;
- Maintain and repair all equipment and vehicles on impervious surfaces, as practicable, away from all sources of surface water;
- Park vehicles at least 50 feet from any stream or wetland unless authorized by a permit or on an existing roadway, as practicable;
- Prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan to prevent, contain, and report accidental spills;
- Design any structures located in floodplains, as feasible, with structural hardening to withstand flooding and to not increase the risk of flooding for other areas of the floodplain;
- Properly space and size culverts in accordance with federal, state, or local regulations;
- Stabilize approaches to streams and stream crossings with clean rock or steel plates during construction to minimize erosion and sedimentation, as practicable;
- Do not permit underwater blasting and pile driving activities in any waterbody;
- Place materials storage and staging areas outside of waterways and floodplains;
- Deposit and stabilize all excavated material not reused in an upland area outside of floodplains and streams; and
- If in-stream construction (trenching or roads) must be conducted during times that streams have flow, maintain adequate waterbody flow rates to protect aquatic life, and prevent the interruption of existing downstream users, as practicable.

16.4.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for geology beyond those listed above for all project types.

16.5. WETLANDS

16.5.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include potential deployment- and operation-related impacts to wetlands resulting from ground disturbance activities. Based on the analyses in Chapters 3 to 15 the deployment and operational activities are expected to have less than significant impacts on wetlands. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements related to potential wetland impacts and permitting to avoid or minimize potential wetland impacts, compensate for unavoidable impacts to wetlands, and restore impacted wetlands;
- Follow all BMPs and mitigation measures related to minimizing soil erosion, sedimentation, and soil compaction presented in Section 9.2, Soils;
- Conduct a detailed baseline study of the wetland to be impacted, if impacts to a specific wetland are unavoidable, to aid in restoration of pre-impact condition, including, as appropriate or required by law, a survey of wetland contours; soil texture and profile; plant species, structure, and cover; and hydrology;
- Develop an SWPPP;
- Prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan to prevent, contain, and report accidental spills;
- Ensure that soil erosion and sediment controls are properly installed and maintained;
- Clearly mark the boundaries of wetland areas to be avoided during construction using flagging, and maintain markers until reclamation is complete (as applicable). Train equipment operators on the activities to avoid within or near wetlands;
- Segregate and salvage all topsoil up to a maximum of 12 inches of topsoil from the area disturbed in dry wetlands, where practicable, and restore topsoil to its approximate original stratum after backfilling is complete;
- Avoid temporarily storing or stockpiling materials in wetland areas or in areas that could alter wetland hydrology (causing damming and flooding) or impede or divert water (causing drying). When unavoidable, place temporary fill on geotextile fabric;
- Minimize vegetation clearing in or near wetlands. If vegetation clearing is required, minimize ground disturbance and maintain low groundcover vegetation, as well as the roots of taller vegetation;
- When construction is unavoidable, time construction to outside the breeding and migratory seasons of wetland wildlife;
- When construction is unavoidable, time construction activities to the low flow period, as defined by the USACE general permit, or to when the soil is frozen;
- Preserve existing tree canopies and natural areas in and around wetlands as much as possible;
- When cutting wetland vegetation is unavoidable, complete the work by hand (chain or hand saw) instead of using large equipment;
- Use timber mats when working in or near wetlands;
- Avoid both above and belowground wetland crossings;

- When crossing a wetland is unavoidable, take advantage of already disturbed areas such as easements, roads, roadway shoulders, bridges, or old railroad beds;
- Span wetlands by locating telecommunication poles on either side of the wetland, instead of disturbing the interior, as practicable and feasible;
- Avoid diversion of surface water and groundwater sources, which could affect nearby wetlands;
- Prohibit use of herbicides or pesticides within 100 feet of any wetland (unless allowed or required by the appropriate land management, tribal, or federal, state, or local agency);
- Conduct post-construction monitoring inspections after the first growing season to determine success of revegetation, as applicable, unless otherwise required by a permit;
- Include engineered or site designed methods to control storm water;
- Create and maintain buffer zones around wetlands to protect their functions and values;
- Develop management plans such as, but not limited to, wetland and vegetation management and restoration, water quality protection, and erosion and sediment control plans for the management of wetland habitat, vegetation, water quality, and soils/erosion control;
- Follow any BMPs and mitigation measures for work in or near wetlands developed by federal, state and local agencies, such as state departments of transportation;
- Position deployment activities to avoid wetlands to the greatest extent practicable and to minimize the project footprint while safely and practically implementing the Proposed Action;
- Install and maintain sediment barriers, as appropriate, at saturated wetlands or wetlands with standing water across the entire construction ROW upslope of the wetland boundary and where saturated wetlands or wetlands with standing water are adjacent to the construction ROW as necessary to prevent sediment flow into the wetland;
- When construction within wetlands is unavoidable, time use of heavy equipment to avoid periods of heavy moisture, as appropriate;
- Where practicable, do not maintain, store, wash, or repair equipment in or near (within 100 feet of) wetland areas to avoid spills or contamination;
- Where practicable, do not use heavy equipment within wetlands, even temporarily, and do not travel through wetlands;
- Use wide-tracked, or low-ground pressure construction equipment and/or conventional equipment operating from the ROW, timber mats, or prefabricated equipment mats. Prohibit storage of hazardous materials, chemicals, fuels, and lubricating oils in wetlands. Use existing access roads whenever possible;
- Where construction is required, maintain natural drainage patterns to the extent practicable by installing culverts in sufficient number and size to prevent ponding, diversion, or concentrated runoff;
- Use gravel for road surfaces where possible to avoid an increase in permeable surfaces and use proper drainage structures to minimize sedimentation and erosion to adjacent wetlands;
- Consult local wetland restoration guidance, including communicating with local agency and other wetland and restoration scientists. Use suggested up-to-date published restoration manuals to ensure that appropriate wetland restoration measures are followed and to increase restoration success;

- In areas where wetlands would be restored, stockpile wetland topsoil and sod mats removed during installation using standard reclamation protocol. Re-use the topsoil and sod mats in the post-construction wetland restoration;
- Revegetate, as applicable, bare areas as progressively and quickly as possible (preferably within the same growing season) to stabilize soils, reduce sedimentation, and avoid the spread of invasive species. Install erosion protection and leave in place until the area is revegetated and the soil is stabilized; and
- Determine restoration to be successful if the surface condition is similar to adjacent undisturbed communities or found acceptable by the applicable regulatory body.

16.5.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply to Wired Projects in addition to those listed above for all project types:

- New Build – Buried Fiber Optic Plant
  - Avoid, as appropriate, stockpiling material from directional drilling in a wetland, or where the stockpile could cause sedimentation into a wetland or dam water, causing flooding of a wetland area; avoid, as appropriate, setting up drilling equipment in a wetland;
  - Conduct dewatering in a manner to prevent erosion and to prevent heavily silt-laden water from flowing directly into any wetland or waterbody if dewatering an excavation;
  - Replace topsoil and restore original contours to the greatest extent practicable;
  - Install buried cable along existing road ROWs wherever possible to minimize vegetation clearing and other potential impacts to wetlands; and
  - Use structures or devices to prevent subdraining or groundwater movement along new trenched-in buried conduit such as anti-seepage collars, intermittent clay barriers, trench plugs, or clay saddles.
- New Build – Aerial Fiber Optic Plant
  - Install overhead transmission lines along existing road ROWs wherever possible to minimize vegetation clearing and other potential impacts to wetlands.
- New Build – Submarine Fiber Optic Plant
  - Avoid, as appropriate, stockpiling material from directional drilling in a wetland, or where the stockpile could cause sedimentation into a wetland or dam water, causing flooding of a wetland area; avoid, as appropriate, setting up drilling equipment in a wetland; and
  - Conduct dewatering in a manner that prevents erosion and prevents heavily silt-laden water from flowing directly into any wetland or waterbody if dewatering an excavation.

16.6. BIOLOGICAL RESOURCES

The potential for impacts to biological resources, including terrestrial vegetation, wildlife, fisheries and aquatic habitats, and threatened or endangered species, could occur through activities such as land clearing, excavation activities, construction, or operation of ground-based and aerial vehicles. Based on the analyses in Chapters 3 to 15, impacts to biological resources

associated with deployment and operation of the Proposed Action are expected to be less than significant; however, potential impacts to threatened and endangered species are expected to be less than significant with the incorporation of BMPs and mitigation measures.

16.6.1. Terrestrial Vegetation

16.6.1.1. BMPs and Mitigation Measures for All Project Types

FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts to terrestrial vegetation:

- Engage in early consultation with appropriate agencies and stakeholders, including but not limited to the U.S. Fish and Wildlife Service (USFWS) and state agencies;
- Follow all applicable federal, state, and local requirements for vegetation removal, disturbance, and restoration;
- Avoid construction/deployment in areas with sensitive vegetation (i.e., woodlots and wetlands), unique habitat (i.e., shorelines and streambanks), or designated natural resources, if practicable;
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce vegetation loss;
- Avoid high-quality habitat;[10]
- Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles before moving from one deployment site to another;
- Identify all areas within the proposed construction footprint that contain noxious or invasive plants and use pre-construction treatments such as mowing or herbicide applications (in consultation with appropriate agencies and stakeholders) prior to ground disturbance activities;
- Minimize land clearing and vegetation disturbance by using existing roads and unvegetated areas, when feasible, during deployment activities;
- Restore disturbed areas as progressively and quickly as possible to pre-construction use and vegetation cover using appropriate and certified seed mixes and seed dispersal, management, and maintenance processes, as applicable;
- Minimize or avoid removal of native vegetation (forest, sage brush, grassland, etc.) whenever possible;
- Close and revegetate any temporary and unnecessary roads after completion of the project;
- Obtain all appropriate permits and comply with permit conditions to minimize or avoid impacts to vegetation;
- Revegetate disturbed areas as progressively and proactively as possible to minimize impacts associated with vegetation loss;

[10] High quality and disturbed habitats are described as follows: Professional biologists can typically provide a basic assessment of the quality of the site based on one or more site visits. Private consultants can also evaluate habitat quality through a standardized assessment tool, the Floristic Quality Assessment (FQA). This assessment will provide a quantitative assessment score. The FQA rates sites on a scale from 0 to 10, 10 being the highest quality. Disturbed habitats generally contain non-native, invasive species; extremely low plant diversity; are under regular maintenance; and area small and surrounded by unsuitable habitat. High quality habitats contain much the opposite: high plant diversity; low numbers of non-native, invasive plants; are left in a natural state; and have high quality plants or ones that are very valuable to wildlife.

- Revegetate with native species that approximate pre-disturbance plant community composition;
- Segregate topsoil or surface soil from subsurface layers during construction for reuse during post-construction seeding;
- Store soil containing noxious or invasive plants awaiting proper disposal, in a location away from clean topsoil and subsoil;
- Locate staging areas and construction sites in previously disturbed areas;
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss and habitat fragmentation;
- Inspect and clean all construction equipment and deployable vehicles on an impervious surface with high-pressure washing equipment to remove soil and plant matter prior to moving to the next job site or staging location;
- Limit construction equipment and vehicles to approved roads or ROWs;
- Use existing roads and regularly maintained areas when conducting routine maintenance and inspections to the extent feasible; and
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts.

16.6.1.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

16.6.2. Wildlife

16.6.2.1. BMPs and Mitigation Measures for All Project Types

FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts to wildlife:

- Engage in early consultation with appropriate agencies and stakeholders as necessary, including but not limited to USFWS, National Marine Fisheries Service (NMFS), and other relevant federal or state wildlife and natural resources agencies;
- Follow guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) for any aboveground lines or cables (e.g., use of diverters);
- Implement seasonal and spatial buffer zones around sensitive areas for deployment and maintenance activities, where possible, as recommended by USFWS and state wildlife and natural resources agencies;
- Implement the National Bald Eagle Management Guidelines (USFWS, 2007);
- Assess locations of roost sites for bats and timing of critical life stages (e.g., maternity and weaning periods) and hibernation for deployment and associated activities (these times vary greatly depending on region, species, and habitat);
- Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practical;

- Avoid Important Bird Areas (IBAs) and other known important bird habitats to the maximum extent practicable;
- Minimize or avoid the need for or use of sodium vapor lights at site facilities to reduce attraction of migratory birds;
- Turn off all unnecessary lighting at night. If nighttime lighting is required use motion sensor security lights that are activated as needed;
- Install nest exclusion devices on existing or new structures to discourage nest construction and use;
- Avoid known marine mammal haulouts or concentration areas for deployment and associated activities;
- Assess critical life stages of marine mammals in haulouts within 1 mile of deployment and associated activities;
- Provide for passage of fish and wildlife in new crossings and avoid reducing the efficiency of a structure to allow passage;
- Avoid roads and rights-of-way that provide access to critical wildlife habitat, and near known migration routes (especially terrestrial and semi-aquatic wildlife routes), stopover sites, and large blocks of habitat;
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce potential habitat loss;
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss and habitat fragmentation;
- Restore habitat in construction zones, staging areas, etc. once construction is complete;
- Control the spread of invasive animals and plants by inspecting and cleaning equipment and vehicles before moving from one deployment site to another, coordinating mowing schedules and assisting agencies and groups with ROW permits, washing mowers and equipment between sites, and educating staff;
- Develop "good housekeeping" procedures to ensure that sites would be kept clean of debris, garbage, and fugitive trash or waste during operation, including microtrash;
- Develop monitoring programs and adaptive management strategies;
- Avoid development in areas that contain high densities of breeding or wintering birds, in high wildlife use areas, migratory staging areas, woodlots, riparian corridors, Audubon Important Bird Areas, Nature Preserves, State and National Parks, State Forests, Fish and Wildlife Areas, and other publicly owned properties;
- To reduce habitat fragmentation, minimize the number of new roads constructed. Maximize use of existing corridors, roads, disturbed or developed areas;
- Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship, lambing/calving, pupping and molting [haulout period], spring/fall migrations) seasons;
- Locate project activities, facilities, and roads away from key habitats (e.g., wetlands, cays,[11] and stream sites) for amphibians and reptiles;
- Minimize herbicide and pesticide use during maintenance activities to the extent possible;

[11] Cays are small, low-elevation, sandy islands on the surface of a coral reef.

- Minimize vehicular harm of animals migrating between seasonal habitats by locating activities, roads, and infrastructure away from these areas, considering a reduction of speed limits, or installing barriers along roadsides;
- Do not permit pets on site in order to avoid harassment and disturbance of wildlife;
- Follow food and waste management protocols to minimize attractants to proposed network deployment sites;
- Where mowing is required for site maintenance, require a minimum mower height of 18 inches to reduce potential mortality to tortoises and snakes;
- Report observations of potential wildlife interactions, including wildlife mortality, to the appropriate agency immediately;
- Store soil containing noxious or invasive plants that are awaiting proper disposal in a location away from clean topsoil and subsoil;
- Use existing roads and regularly maintained areas when conducting routine maintenance and inspections to the extent feasible;
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts;
- Limit construction equipment and vehicles to approved roads or ROWs; and
- Additional tower lighting BMPs are described in Section 16.6.2.2, Project-Type Specific BMPs and Mitigation Measures (below).

16.6.2.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wired Projects
  - New Build – Aerial Fiber Optic Plant
    - Install bat exclusions and/or deterrents on existing and new structures.
    - Follow recommendations and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2006) (APLIC and USFWS, 2005) (APLIC, 2012) for any aboveground lines or cables (e.g., use of diverters and anti-nesting devices).
- Wireless Projects
  - New Wireless Communication Towers
    - Site towers away from known communal bat use areas and high bird use areas to the extent practicable or feasible.
    - Where practicable or feasible, located towers more than three miles from any ocean or Great Lake shoreline.
    - If towers are closer than three miles to the shoreline, there should be: site-specific studies and a preference for self-standing (un-guyed) towers that are short enough to not require lighting.
    - If towers are closer than three miles to the shoreline and sufficiently tall to require lighting, there should be: site-specific studies; and a preference for self-standing (un-guyed) towers with lighting that does not include steady-burning lights.

- Follow updated FAA lighting requirements to eliminate steady-burning, flashing obstruction lights and use only flashing obstruction lights (FAA, 2016a).
- Implement guidance contained in the FCC notice "Opportunities to Reduce Bird Collisions with Communications Towers While Reducing Tower Lighting Costs" (FCC, 2017).
- Follow guidelines outlined by USFWS for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS, 2013a):
  1. Collocation of the communications equipment on an existing communication tower or other structure (e.g., billboard, water and transmission tower, distribution pole, or building mount) is strongly recommended. Depending on tower load factors and communication needs, anywhere from 6 to 10 providers should collocate on an existing tower or structure, provided that frequencies do not overlap/'bleed' or where frequency length or broadcast distance requires higher towers. New towers should be designed structurally and electronically to accommodate the applicant's antenna, and antennas of at least two additional users—ideally 6 to 10 additional users, if possible—unless the design would require the addition of lights and/or guy wires to an otherwise unlit and/or unguyed tower. This recommendation is intended to reduce the number of towers needed in the future.
  2. If collocation is not feasible and a new tower or towers are to be constructed, it is strongly recommended that the new tower(s) should be not more than 199 feet above ground level (AGL), and that construction techniques should not require guy wires. Such towers should be unlighted if Federal Aviation Administration (FAA) regulations and lighting standards permit (FAA, 2007) (Patterson, J., 2012).[12] Additionally, the Federal Communications Commission (FCC), through recent rulemaking, now requires that new towers > 450 ft AGL contain no red-steady lights. FCC also recommends that new towers 350-450 ft AGL also contain no red-steady lights, and that new towers < 350 ft AGL convert non-flashing lights to flash with existing flashing lights. LED lights are being suggested as replacements for all new construction and for retrofits, with the intent of future synchronizing of the flashes. Given these dynamics, the Service recommends using lattice tower or monopole structures for all towers < 200 ft AGL and for taller towers where feasible. The Service considers the < 200 ft AGL option the 'gold standard' and suggests that this is the environmentally preferred industry standard for tower placement, construction, and operation—i.e., towers that are unlit, unguyed, monopole or lattice, and less than 200 ft AGL.
  3. If constructing multiple towers, the cumulative impacts of all the towers to migratory birds—especially to Birds of Conservation Concern (USFWS, 2008) and threatened and endangered species, as well as the impacts of each individual tower, should be considered during the development of a project.

[12] Current FAA guidance (USFWS, 2012) requires lighting for towers greater than 200 feet.

4. The topography of the proposed tower site and surrounding habitat should be clearly noted, especially in regard to surrounding hills, mountains, mountain passes, ridge lines, rivers, lakes, wetlands, and other habitat types used by raptors, Birds of Conservation Concern, state and federally listed species, and other birds of concern. Active raptor nests, especially those of Bald and Golden Eagles, should be noted, including known or suspected distances from proposed tower sites to nest locations. Nest site locations for Golden Eagles may vary between years, and unoccupied, inactive nests and nest sites may be re-occupied over multiple years. The Service's 2013 Eagle Conservation Plan Guidance, Module 1, Land-based Wind Energy, Version 2, available on our website, is a useful document (USFWS, 2013b).
5. If at all possible, new towers should be sited within existing 'antenna farms' (i.e., clusters of towers), in degraded areas (e.g., strip mines or other heavily industrialized areas), in commercial agricultural lands, in Superfund sites, or other areas where bird habitat is poor or marginal. Towers should not be sited in or near wetlands, other known bird concentration areas (e.g., state of federal refuges, staging areas, rookeries, and Important Bird Areas), in known migratory, daily movement flyways, areas of breeding concentration, in habitat of threatened or endangered species, or key habitats for Birds of Conservation Concern (USFWS, 2008). Disturbance can result in effects to bird populations, which may cumulatively affect their survival. The Service has recommended some disturbance-free buffers, e.g., 0.5 mi around raptor nests during the nesting season, and 1-mi disturbance free buffers for Ferruginous Hawks and Bald Eagles during nesting season in Wyoming (USFWS WY Ecological Services Field Office, referenced in Manville 2007:23). The effects of towers on 'prairie grouse,' 'sage grouse,' and grassland and shrub-steppe bird species should also be considered since tall structures have been shown to result in abandonment of nest site areas and leks, especially for 'prairie grouse' (Manville, A., 2004). The issue of buffers is currently under review, especially for Bald and Golden Eagles. Additionally, towers should not be sited in areas with a high incidence of fog, mist, and low cloud ceilings.
6. If taller (> 199 ft AGL) towers requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used.[13] Unless otherwise required by the FAA, only white strobe or red strobe lights (red preferable since it is generally less displeasing to the human eye at night), or red flashing incandescent lights should be used at night, and these should be the minimum number, minimum intensity (< 2,000 candela), and minimum number of flashes per minute (i.e., longest duration between flashes/'dark phase') allowable by the FAA. The use of solid (non-flashing) warning lights at night should be avoided (Patterson, J., 2012)

[13] This guidance was based on earlier FAA guidance that has since been updated (USFWS, 2013c). Current FAA guidance (FAA, 2015) now requires lighting for towers greater than 200 feet.

(Gehring et al., 2009)—see recommendation #2 above. Current research indicates that solid (non-flashing) red lights attract night-migrating birds at a much higher rate than flashing lights (Gehring et al., 2009) (Manville, A., 2009). Recent research indicates that use of white strobe, red strobe, or red flashing lights alone provides significant reductions in bird fatalities (Patterson, J., 2012) (Gehring et al., 2009).

7. Tower designs using guy wires for support, which are proposed to be located in known raptor or waterbird concentrations areas, daily movement routes, major diurnal migratory bird movement routes, staging areas, or stopover sites, should have daytime visual markers or bird deterrent devices installed on the wires to prevent collisions by these diurnally moving species. The efficacy of bird deterrents on guy wires to alert night migrating species has yet to be scientifically validated. For guidance on markers, see Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines -- State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, DC, and Sacramento, CA. 207 pp, and APLIC. 2012. Reducing Avian Collisions with Power Lines -- the State of the Art in 2012. Edison Electric Institute and APLIC. Washington, DC. 159 pp. Also see www.aplic.org, www.energy.ca.gov, or call 202-508-5000.
8. Towers and appendant facilities should be designed, sited, and constructed so as to avoid or minimize habitat loss within and adjacent to the tower 'footprint.' However, a larger tower footprint is preferable to the use of guy wires in construction. Several shorter, un-guyed towers are preferable to one tall guyed, lighted tower. Road access and fencing should be minimized to reduce or prevent habitat fragmentation, disturbance, the creation of barriers, and to reduce above ground obstacles to birds in flight.
9. If it has been determined prior to tower design, siting and construction that a significant number of breeding, feeding and roosting birds—especially Birds of Conservation Concern (USFWS, 2008), state or federally-listed bird species, and eagles—are known to habitually use the proposed tower construction area, relocation to an alternate site is highly recommended. If this is not an option, seasonal restrictions on construction are advised in order to avoid disturbance, site and nest abandonment, especially during breeding, rearing and other periods of high bird activity.
10. Security lighting for on-ground facilities, equipment and infrastructure should be motion- or heat-sensitive, down-shielded, and of a minimum intensity to reduce nighttime bird attraction and eliminate constant nighttime illumination, while still allowing safe nighttime access to the site (Manville, 2011) (USFWS, 2012).
11. Representatives from the USFWS or researchers from the Research Subcommittee of the Communication Tower Working Group should be allowed access to the site to evaluate bird use; conduct dead-bird searches; place above ground net catchments below the towers (USFWS, 2000); and to perform studies using radar, Global Position System, infrared, thermal imagery, and acoustical

monitoring, as necessary. This will allow for assessment and verification of bird movements, site use, avoidance, and mortality. The goal is to acquire information on the impacts of various tower types, sizes, configurations, and lighting protocols.

12. Towers no longer in use, not re-licensed by the FCC for use, or determined to be obsolete should be removed from the site within 12 months of cessation of use, preferably sooner.
13. In order to obtain information on the usefulness of these guidelines in preventing bird strikes and better understanding impacts from habitat fragmentation, please advise USFWS personnel of the final location and specifications of the proposed tower, and which measures recommended in these guidelines were implemented. If any of these recommended measures cannot be implemented, please explain why they are not feasible. This will further advise USFWS in identifying any recurring problems with the implementation of the guidelines, which may necessitate future modifications.

    - Follow the FAA requirements to eliminate steady-burning flashing obstruction lights and use only flashing obstruction lights in accordance with FAA Advisory Circulars AC 70/7460-1L and AC 150/5345-43H (FAA, 2016a) (FAA, 2016b) (FCC, 2017).
  - Collocation on Existing Wireless Tower, Structure, or Building
    - Follow the FAA requirements to eliminate steady-burning flashing obstruction lights and use only flashing obstruction lights in accordance with FAA Advisory Circulars AC 70/7460-1L and AC 150/5345-43H (FAA, 2016a) (FAA, 2016b) (FCC, 2017).
- Deployable Technologies
  - Avoid activities within migratory bird flyways and in the immediate vicinity of bat roosts to the extent practicable;
  - Do not operate aircraft at an altitude that could disturb known natural roosting sites of bats, with the only exception being severe weather conditions;
  - Do not operate aircraft at an altitude lower than 1,500 feet within 0.5 mile of known calving/lambing areas during critical life stages, with the exception only for severe weather conditions; and
  - Do not operate aircraft at an altitude lower than 1,500 feet within 0.5 mile of known seal haulouts observed on land, with the exception only for severe weather conditions.

16.6.3. Fisheries and Aquatic Habitats

16.6.3.1. BMPs and Mitigation Measures for All Project Types

FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts to fisheries and aquatic habitats:

- Engage in early consultation with appropriate agencies and stakeholders, including but not limited to USFWS, NMFS, and other relevant federal or state wildlife and natural resources agencies;
- Follow all applicable federal and state requirements for construction activities near/in fish and fish habitat;

- Establish buffers around sensitive areas (e.g., nesting sites, wetlands);
- Avoid construction, as practicable, during sensitive seasons for fish such as migration, spawning, egg development (including intra-gravel development) and larval fish (benthic or pelagic)[14] development (sensitive seasons/time periods vary by species and location);
- Avoid construction/deployment, as practicable, in productive riparian zones, marine preserves, and wetlands since construction could potentially result is less refuge for fish, fundamental changes in channel structure (e.g., loss of pool habitats), instability of stream banks, and alteration of nutrient and prey sources within the shoreline aquatic community (Hansen, Halvey, & Strach, 2013);
- Avoid physical barriers in waterbodies, to the extent practicable, during installation and operation to allow for the migration of invertebrates and other aquatic fauna;
- Avoid productive habitats to the extent practicable, such as coastal wetlands, inland waterways, essential fish habitats, spawning areas, and reefs;
- Consolidate facilities as much as possible;
- Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles before moving from one deployment site to another;
- Implement an emergency response plan for fuel spills and environmental emergencies;
- Implement invasive species plans to minimize introduced aquatic plant and animal species into the Proposed Action areas (i.e., wash and inspect equipment and vehicles before moving from one drainage basin or watershed to the next);
- Include secondary containment for hazardous materials such as fuels and use uplands, as feasible, away from streams and waterbodies for refueling of construction or operations equipment;
- Instruct all construction employees to avoid harassment and disturbance of fish and other aquatic species, and report any signs of mortality to the appropriate agency immediately;
- Minimize construction noise in and near fish habitats, as practicable;
- Avoid vegetation removal or siting projects in areas in areas with poor bank or shoreline stability to minimize the potential for erosion and sedimentation;
- Minimize sedimentation and turbidity in fish habitats by implementing sediment and erosion control measures, as practicable; the use of such measures (e.g., silt fences, silt curtains,[15] and erosion control blankets) could reduce erosion and sedimentation;
- Minimize the amount of fill placed in wetlands and streams when constructing access roads by installing bridges and or culverts. Use culverts and bridges that are appropriately designed and sized for fish passage;
- Revegetate and restore riparian areas and other vegetated areas around aquatic resources to the extent possible once construction activities are complete;
- Use set-backs when clearing vegetation for construction, where appropriate, from riparian zones to avoid removal of important fish cover such as vegetation boulders, and large woody debris;

[14] Inhabiting the water column as opposed to being associated with the sea floor; generally occurring anywhere from the surface to 1,000 meters (NOAA, 2006).
[15] Silt curtains are floating barriers used in marine construction and remediation to control silt and sediment in a body of water.

- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts;
- Perform regular maintenance checks of equipment near protected areas to minimize detachment of components reaching critical habitat by tidal flow; and
- Report spills or other observed pollutants to the appropriate agency immediately.

16.6.3.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply to Wired Projects in addition to those listed above for all project types:

- New Build – Buried Fiber Optic Plant
  - Use horizontal directional drilling where possible and appropriate, for stream crossings to avoid potential impacts to the streambed, banks, and associated fish habitat.

16.6.4. Threatened and Endangered Species

16.6.4.1. BMPs and Mitigation Measures for All Project Types

To avoid or minimize potential effects of deployment activities to threatened and endangered species, BMPs and mitigation measures, as defined through consultation with the appropriate resource agency, would be implemented. Additional BMPs and mitigation measures, listed below, may be implemented as appropriate to further minimize potential impacts:

- Engage in early consultation with appropriate agencies and stakeholders including, but not limited to, USFWS, NMFS, and other relevant federal, or state wildlife and natural resources agencies;
- Follow all applicable federal and state requirements for construction activities near/in fish and fish habitat;
- Avoid conducting deployment activities in areas with known locations or habitats for threatened and endangered plants;
- Avoid activities within seagrass beds and control turbidity to minimize potential indirect impacts on seagrass;
- Avoid potential impacts within coastal estuarine habitats;
- Use appropriate sediment and erosion control measures to minimize sedimentation and turbidity in fish habitats;
- Use setbacks from riparian zones when clearing vegetation for construction to avoid removal of important fish cover such as vegetation boulders and large woody debris;
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce potential habitat loss;
- Avoid removal or disturbance of native vegetation (forest, sage brush, grassland, etc.) to the maximum extent practicable and ensure that any unavoidable forest impacts do not result in the loss of listed snails, butterflies, bird breeding habitat, or bat roost sites or hibernacula;[16]
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall habitat fragmentation;
- Establish buffers around habitat areas, whenever possible, due to the limited range for some federally listed species;
- Implement seasonal and spatial buffer zones for operational activities that involve potentially disturbing activities in listed species use areas;
- Implement seasonal and spatial buffer zones for construction and other potentially disturbing activities during sensitive periods for listed species such as breeding, nesting, calving/pupping, haulout, migration, spawning, and egg development as identified by USFWS, NMFS, and/or other relevant federal or state agencies;
- Avoid bat roosting areas, particularly maternity roost colonies, during critical life stages for deployment and associated activities (i.e., approximately April to November);
- Avoid or minimize the use of sodium vapor lights at site facilities to reduce attraction of migratory birds;

[16] Hibernacula are the habitats within which animals hibernate or otherwise seek refuge for extended periods.

- Implement invasive species plans to minimize introduced aquatic plant and animal species into the areas affected by the Proposed Action (i.e., wash and inspect equipment and vehicles before moving from one drainage basin or watershed to the next);
- Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles on an impervious surface before moving from one deployment site to another;
- Develop and implement operational monitoring and adaptive management procedures;
- Follow food and waste management protocols to minimize attractants to the deployment site;
- Implement "good housekeeping" procedures to ensure that during operation the sites would be kept clean of debris, garbage, and fugitive trash or waste, including microtrash;
- Implement a strict policy prohibiting pets on site and prohibiting hunting or fishing or any other action that would result in any avoidable disturbance of listed species;
- Implement an emergency response plan for fuel spills and environmental emergencies;
- Include secondary containment for hazardous materials and use non-wetland sites away from streams and waterbodies for refueling of construction or operations equipment;
- Instruct all employees involved in construction/deployment activities to identify and report any sightings of listed species, to avoid harassment and disturbance of wildlife, and to not disturb or enter any nearby caves or mines;
- Minimize the use of coastal lighting, particularly in the vicinity of known turtle nesting areas. If the use of coastal lighting in sea turtle use areas is unavoidable, use turtle safe lighting instead of normal lights (i.e., low-pressure sodium-vapor lighting or red lights that emit a very narrow portion of the visible light spectrum) and consult with local sea turtle experts on the design of the coastal lighting plan;
- Report observations of sensitive species that are injured, dead, or entangled to the appropriate agency immediately;
- Train construction and deployment staff in the Proposed Action BMPs and mitigation measures and incentivize reporting of any lapses in BMP and mitigation measure implementation;
- Turn off all unnecessary lighting at night; and
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts.

16.6.4.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wired Projects
  - New Build – Aerial Fiber Optic Plant
    - Follow guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) for any above-ground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).

  - Collocation on Existing Aerial Fiber Optic Plant
    - Follow guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) for any above-ground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).
  - Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable
    - Minimize underwater construction noise in all aquatic habitats by minimizing vessel speed, using quieter equipment or technologies, or deploying bubble curtains or other noise screens during underwater work; and
    - Implement a marine observer program during construction and operation to avoid and minimize boat strikes.
- Wireless Projects
  - New Wireless Communication Towers
    - Follow guidelines outlined by USFWS for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS, 2013a) mentioned above in Section 9.6.2, Wildlife.
- Deployable Technologies
  - Restrict aircraft operation at altitudes lower than 1,500 feet within 0.5 mile of known pupping or haulout areas during critical life stages, with the exception only for severe weather conditions; and
  - Keep aircraft above altitudes higher than 1,500 feet within 0.5 mile of seals hauled out on land, with the exception only for severe weather conditions.

16.7. LAND USE, RECREATION, AND AIRSPACE

16.7.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include potential deployment- and operation-related impacts to land use, recreation, and airspace resulting from activities including the construction or installation of infrastructure, or deployment of deployable assets. Based on the analyses in Chapters 3 to 15, potential impacts from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Land Use
  - Follow applicable federal, state, and local land use plans and policies to ensure compatibility with existing and surrounding land uses;
  - Follow and comply with applicable existing zoning requirements to ensure compatibility with existing and surrounding land uses;
  - Contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify potentially sensitive land uses and land use issues and concerns specific to the region;
  - Sign areas, access roads, and/or easements that would require temporary closure or limited access to accommodate certain land uses;

  - Schedule construction activities, where feasible, to minimize impacts to existing and surrounding land uses;
  - Utilize existing roads, ROWs, easements, and utility corridors to the maximum extent feasible and to minimize the number of new access roads;
  - Give preference to development options that involve use of existing physical infrastructure, and/or that do not involve new aboveground structures (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.), especially near recreation lands;
  - Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (e.g., cut and fill) or vegetation, and that are as far from surrounding residences as possible;
  - Avoid or minimize, as practicable and feasible, construction activities in areas covered by existing incompatible easements;
  - Retain existing vegetation wherever possible to provide visual screening of new infrastructure; and
  - Select infrastructure designs that minimize contrast with the surrounding landscape and land uses.
- Recreation
  - Contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify recreation activities specific to the region and their respective seasons;
  - Sign areas, access roads, and/or recreation trails that would require temporary closure, limited access, or detours to accommodate certain recreation activities;
  - Schedule deployment activities, where feasible, to not interfere with seasonal recreation activities;
  - Utilize existing roads, ROWs, easements, and utility corridors to the maximum extent feasible and to minimize the number of new access road;
  - Complete deployment activities with minor, temporary impacts to recreation resources during periods or seasons of low use;
  - Give preference to infrastructure locations that are compatible with existing park or recreation planning documents;
  - Complete deployment activities, to the extent practicable, outside of and away from existing recreation locations; and
  - Select infrastructure locations that are as far from recreation lands as possible.
- Airspace
  - Follow all applicable federal, state, and local requirements for preservation of the airspace to avoid or minimize reducing existing capacity, decreasing safety, negatively impacting current operations, or increasing the risk to airspace users or persons and property;

- To the extent practicable, avoid deploying and operating wired and wireless sources near airports/facilities that trigger the need for an OE/AAA by the FAA based on height and airport elevation criteria; and
- For new construction, prepare site plans with sufficient detail to assess potential impacts to special use areas, restricted airspace, and general and military aviation.

16.7.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wireless Projects
  - New Wireless Communication Towers
    - Select the shortest possible structures necessary to meet the FirstNet system's needs, and only deploy towers less than 200 feet in height wherever possible;
    - Place new infrastructure near existing similar infrastructure where possible, to minimize the total number of new aerial navigation hazards;
    - Work closely with the National Park Service (NPS) to address any concerns they might have if a tower needs to be placed in an area that might affect the nighttime sky at an NPS unit;
    - Avoid placing new infrastructure near airports or the areas regulated under the FAA's Part 77 regulations (FAA, 2016a); and
    - Avoid placing new infrastructure within Military Operations Areas or under Military Training Routes unless coordinated with the relevant military unit.
- Deployable Technologies
  - Coordinate early with FAA on aerial deployable technologies (flying unmanned aerial systems [UAS] and balloon launches) to establish procedures that are in place prior to the need to use these technologies during emergency response events; and
  - Limit the use of Deployable Airborne Communications Architecture to areas less likely to be used by commercial, military, or private aviation (to the degree feasible, and in consultation with the FAA and Department of Defense).

16.8. VISUAL RESOURCES

16.8.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action could result in impacts to visual resources through the construction of towers, structures, roads, or other permanent features, as well as the installation of security or aviation lighting. Based on the analyses in Chapters 3 to 15, impacts to most visual resources associated with the deployment and operation of the Proposed Action are expected to be less than significant; however, impacts to night skies in rural areas are expected to be less than significant with the incorporation of BMPs and mitigation measures. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Proposed design should take into account the scenic character of the surrounding area to reasonably minimize or avoid visual impacts to the surrounding area when viewed from existing roadways or shorelines (design structures to complement the natural landscape; for example, use paint that blends with the surrounding landscape);
- Utilize non-reflecting coatings to towers, antennas, buildings, and associated structures where possible;
- Implement sensitive grading techniques that blend with the natural terrain;
- Treat all disturbed slopes for erosion control;
- Where appropriate, use vegetation as screens to block views of structures and roadways;
- Minimize the area of bare soil at any one time as much as possible by constructing in stages;
- Revegetate disturbed areas as progressively and quickly as practicable to restore vegetative cover;
- Reduce or eliminate the need for lighting on poles or structures, or restrict the duration and directionality of needed lighting;
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.), and specifically avoid the construction of new aerial fiber optic plant and/or new wireless communication towers within or in locations within sight of federal or other lands where visual resources are regulated (e.g., units of the National Park System, or areas where local zoning regulations emphasize protection of views or aesthetic conditions), or where residents and visitors have come to expect high visual quality and the absence of human-built structures;
- Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (i.e., cut and fill) or vegetation, and that are as far from surrounding residences as possible;
- Select infrastructure designs that minimize construction footprints;
- Comply with all relevant and applicable federal, state, or local regulations and guidance regarding visual and aesthetic conditions and impacts; and
- Comply with the BMPs and mitigation measures for towers required by USFWS, as detailed in Section 9.6.2, Wildlife.

16.8.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply to Deployable Technologies in addition to those listed above for all project types:

- Select parking locations for deployable technologies that are screened from view by topography or vegetation, that are as far away from as many observers as possible, and that are not in or near areas considered scenic, such as shorelines, ridgelines, or scenic roads; and
- Select deployable designs that minimize the use of nighttime lighting, that include shielded or directional nighttime lighting, and/or that use the minimum nighttime lighting required for safe operations.

16.9. SOCIOECONOMICS

16.9.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include deployment and operations activities that would involve public expenditures, construction, and related activities, all of which may influence socioeconomics depending on the deployment activity and location. Based on the analyses in Chapters 3 to 15, potential impacts from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Avoid development of new wireless communication towers in or near residential areas, in order to reduce the potential that such activities could have adverse impacts on residential property values. Acceptable distances could vary depending on the nature of the aesthetic impacts, the nature of other objectionable effects that influence property values, and other factors such as: residential density, local concern over aesthetics, desire for improved wireless communications, local media response, and more. According to a recent literature review, measurable adverse impacts of wireless communication towers on property values are generally not observable beyond 300 meters (984 feet), and often are not observable beyond 100 meters (328 feet) (Bond, Sims, & Dent, 2013);
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, buried, or undersea infrastructure, etc.);
- Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (i.e., cut and fill) or vegetation and that are as far from surrounding residences as possible to minimize potential impacts to surrounding property values;
- Retain existing vegetation wherever possible to provide visual screening of new infrastructure;
- Select infrastructure designs that minimize contrast with the surrounding landscape;
- Avoid development or enlargement of storage, staging, and launch/landing areas for deployable technologies in or near residential areas, in order to reduce the potential that such activities could have adverse impacts on residential property values. Acceptable distances could vary, depending on the size of the facility, types of activities occurring there, the nature of the aesthetic impacts or other aspects that influence property values, and other factors such as residential density, local concern over aesthetics, desire for improved wireless communications, local media response, and more;
- Give preference to hiring workers who are local residents, where practicable; and
- Share deployment plans with public service providers, especially first responders, as early in the process as possible and throughout the deployment process. This will provide advance notice to public service providers, and would particularly allow first responders to be better prepared for emergencies that could arise during deployment.

16.9.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

16.10. ENVIRONMENTAL JUSTICE

16.10.1. BMPs and Mitigation Measures for All Project Types

Impacts are considered environmental justice impacts only if they are both "adverse" and "disproportionately high" in their incidence on environmental justice populations relative to the general population (Council on Environmental Quality, 1997). Based on the analyses in Chapters 3 to 15, potential environmental justice impacts from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all BMPs identified throughout this PEIS that reduce adverse impacts of construction activities, such as generation of noise, dust, and traffic;
- Avoid setting deployment activities and facilities requiring construction in proximity to environmental justice communities, in order to reduce the potential that such activities would be seen as disproportionately affecting environmental justice communities. In general, proximity means within a distance at which noise and dust would be considered objectionable or where effects on traffic volume or patterns would be considered detrimental to local residents or businesses;
- Because of their potential impacts on property values, avoid development of new wireless communication towers in proximity to environmental justice communities in order to reduce the potential that such activities would be seen as disproportionately affecting environmental justice communities. Proximity could be defined variably depending on the nature of the aesthetic impacts, nature of other objectionable effects that influence property values, other factors (e.g., local concern over aesthetics), desire for improved wireless communications, local media response, etc. According to a recent literature review, measurable adverse impacts on property values are generally not observable beyond 300 meters (984 feet), and often are not observable beyond 100 meters (328 feet) (Bond, Sims, & Dent, 2013);
- Where possible, identify specific communities (i.e., neighborhoods or populations that may be contained within individual block groups) that are at risk of experiencing environmental justice impacts. Conduct targeted outreach to these communities—tailored to the specific racial, ethnic, financial, and/or cultural background—as early in the development process as possible to explain the nature and extent of specific potential impacts, and to gain feedback on those impacts;
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, buried, or undersea infrastructure, etc.); and
- Where possible, select infrastructure locations that are not within or near environmental justice communities, particularly new build options.

16.10.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

16.11. CULTURAL RESOURCES

16.11.1. BMPs and Mitigation Measures for All Project Types

Deployment involving ground disturbance has the potential to damage or destroy archaeological sites, and the attachment of communications equipment to historic building and structures has the potential to cause damage to features that are historically significant. Based on the analyses in Chapters 3 to 15, potential impacts from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures to further reduce potential impacts:

- Follow all applicable federal requirements for agency and tribal consultation on the identification of and assessment of effects to cultural resources;
- Avoid deployment in areas with known historic properties and deploy equipment and facilities in alternate locations if practical;
- Ensure usage of an appropriate indirect effects Area of Potential Effects as part of pre-siting or pre-deployment surveys to sufficiently account for potential indirect effects to cultural resources;
- Establish procedures for pre-deployment monitoring if a project has the potential to adversely and indirectly affect historic properties to collect baseline data, monitor potential indirect effects during deployment, and determine if effects have occurred post-deployment;
- Follow all applicable federal and state requirements if inadvertent discoveries of human remains are made during deployment or operations;
- Develop BMPs and mitigation measures as part of a Memorandum of Agreement or Programmatic Agreement to address any potential effects, if they were to occur;
- Use low-impact construction alternatives, when feasible. For instance, ripping[17] could be used as an alternative to blasting near structures or archaeological sites identified as at risk of effects from vibration. Other techniques such as bored piling could be used to minimize the vibration generated, where possible;
- Restrict the timing of deployment activities so as not to disturb the use of historic properties, as applicable. Stop work at certain times when traditional and/or religious properties are in use, such as during significant events (e.g., religious festivals or ceremonies);
- Design projects to mitigate potentially negative visual and auditory impacts of facilities. The following visual and noise abatement techniques should be considered: noise-reducing barriers, low-profile constructions, proper siting to maximize the use of topography and vegetation, screening, blending with topographic forms and existing vegetation patterns, and use of environmental coloration or advanced camouflage techniques to limit visual effects;

[17] Ripping is typically performed by a tractor or other heavy equipment to pull the rock.

- Consult with site users through a community liaison team to understand site usage and how the project could affect user access; and
- Arrange alternative access using stakeholder input if access to an important cultural heritage site is restricted or blocked. Notify the public of the blockage and alternate means of access.

16.11.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for soils beyond those listed above for all project types.

16.12. AIR QUALITY

16.12.1. BMPs and Mitigation Measures for All Project Types

The Proposed Action has the potential to generate air pollutant emissions through construction and deployment activities, including the use of large vehicles, heavy machinery, or generators. Based on the analyses in Chapters 3 to 15, the impact to air quality from the deployment and operation activities described above are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for obtaining air pollution control permits for applicable emission sources;
- Avoid constructing and operating emission sources in extreme or severe nonattainment areas and Class I Areas to the extent practicable;[18]
- Ensure all activities are in compliance with general conformity requirements in nonattainment and maintenance areas;
- For equipment with internal combustion engines, use engines certified to the lowest emission standards and engines that burn alternative fuels (e.g., natural gas, biofuels), and/or install emission control devices when practicable;
- Use low-sulfur or ultra-low-sulfur diesel fuel in construction equipment, trucks, vehicles, and generators;
- When possible, use vehicles with hybrid or electric technology to reduce or eliminate criteria pollutant emissions from fuel combustion;
- To control dust from construction or other land-disturbing activities, spray water on roads/construction areas, limit the area of uncovered soil to the minimum needed for each activity, site staging areas to minimize fugitive dust, use a soil stabilizer (chemical dust suppressor), mulch areas or use a temporary gravel cover, limit the number and speed of vehicles on the site, and cover trucks hauling dirt;
- Post and enforce speed limits on dirt/gravel roads to reduce airborne fugitive dust;
- Limit idling time of construction vehicle and equipment and conduct proper vehicle maintenance;

[18] Class I areas are national parks and wilderness areas in attainment or unclassifiable areas that exceed 5,000 acres in size and were in existence on August 7, 1977.

- Minimize the time of operation of UAS or aircraft below the mixing height (i.e., typically estimated at 3,000 feet above ground level);
- Use electric or alternate fueled ground support equipment for UAS or other aircraft;
- Ensure all activities conform to the State Implementation Plan;
- Follow all applicable federal, state, and local air quality requirements, including standards for nuisance (where possible) and fossil fuel-powered generators;
- Ensure all diesel engines are compliant with USEPA emission standards for the corresponding engine class;
- Ensure all equipment are appropriately sized for the Proposed Action;
- Consider using hydrogen-fueled generators where practicable to reduce nitrous oxides emissions;
- Obtain permits, where required, to install and operate fossil fuel-powered generators;[19]
- Implement a dust control plan for construction activities and any travel over unpaved roads; and
- Ensure all fuel-burning equipment including, but not limited to, heavy construction equipment, power generators, and aerial platforms are maintained in accordance with manufacturer's specifications.

16.12.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

16.13. NOISE AND VIBRATION

16.13.1. BMPs and Mitigation Measures for All Project Types

The Proposed Action has the potential to generate noise and vibration during construction activities, deployment, and operation of various equipment. Based on the analyses in Chapters 3 to 15, the impacts to noise and vibration from the deployment and operation activities associated with the Proposed Action are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for construction noise and vibration restrictions;
- For those projects involving heavy equipment for deployment that can generate noise and vibration, avoid, as practicable, deployment in areas with highly sensitive receptors and construct facilities in alternate locations. Such sensitive areas include foraging or breeding areas for disturbance-sensitive congregatory species (such as some species of bats, colonial waterbirds, and seabirds), particularly those species that are listed as threatened or endangered, as well as wilderness areas (where recreational activities such as hiking, bird watching, etc. occur);

[19] Permits for stationary sources (diesel generators) should be obtained in advance of future deployment.

- For construction and grading activities near populated areas, heavy equipment should use noise mufflers to limit noise exposure on noise-sensitive receptors;
- For construction and grading activities near other noise sensitive receptors, including parks or other protected areas, heavy equipment should use noise mufflers to limit noise exposure, and the use of such equipment should be limited to operation only during daytime hours;
- Follow all state and federal guidelines for limiting aircraft noise on populated areas and over national parks;
- Equipment that is expected to generate significant noise and vibration should include mitigation measures during the design and implementation phases of the project (e.g., use of noise barriers such as walls, shrubbery);
- Limit construction activities to daytime hours (7 a.m. to 7 p.m.) to the extent possible when increased noise and vibration levels are more tolerable and avoid construction on Sundays and legal holidays;
- Implement BMPs and mitigation measures as directed by the local jurisdiction such as avoiding unnecessary revving of engines, switching off equipment when not in use, changing location of stationary construction equipment, minimizing drop height of materials, replacing conventional audible reversing alarms with more quiet alternative reversing warning systems, setting equipment away from noise sensitive areas (if practicable), notifying adjacent residents in advance of construction work, installing temporary acoustic barriers around stationary construction noise sources, and other controls as needed to reduce increased noise levels; and
- Ensure, as practicable, all heavy equipment, power generators, and boats are maintained in accordance with manufacturer's specifications.

16.13.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wired Projects
  - New Build – Submarine Fiber Optic Plant
    - Do not permit underwater blasting and pile driving activities in any waterbody.

16.14. CLIMATE CHANGE

16.14.1. BMPs and Mitigation Measures for All Project Types

The Proposed Action has the potential to generate greenhouse gas emissions during deployment and operation activities, which could include ground disturbing activities and the use of various equipment, machinery, and vehicles. Based on the analyses in Chapters 3 to 15, the climate change impacts from the deployment and operation activities described above are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Ensure proper sizing of both transmitting and generating equipment;

- Ensure that equipment used is the most energy efficient, or use state-of-the-art equipment to increase energy efficiency;
- Ensure that construction vehicles are running only when required for construction and reduce or limit unnecessary idling;
- Select energy-efficient technologies (both consuming and generating) whenever possible;
- Use renewable energy such as photovoltaic/battery/hybrid combinations where possible;
- Ensure proper loading of generating equipment during operations; and
- Rely on grid-delivered power whenever available and feasible.

Impacts on the project resulting from climate change, such as sea level rise or storm damage, would vary by state and deployment activity. BMPs and mitigation measures may have to be considered and tailored to specific sites and circumstances as each project is developed. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to address the impacts of climate change on the Proposed Action:

- Ensure design of above ground structures and equipment has included allowances for maximum temperature and precipitation changes;
- Assess sea level rise prior to installation of infrastructure near coastal areas;
- Reinforce structures to include allowances for extreme weather events and flooding;
- Work jointly with public authorities in the implementation of monitoring plans and action plans related to potential impacts that could affect the Preferred Alternative;
- Ensure all operators and drivers have received adequate training to efficiently use equipment;
- Conduct regular maintenance and inspection on equipment to ensure that it is running at the maximum energy efficiency;
- Minimize disturbed land area and soil disturbance by co-locating where it is feasible;
- Revegetate disturbed land areas after construction where it is feasible;
- Use more fuel-efficient diesel-power generation units or low-emission units such as gasoline- or hydrogen-fueled power generators; and
- Use access roads previously used during deployment activities for maintenance and operational activities.

16.14.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

16.15. HUMAN HEALTH AND SAFETY

16.15.1. BMPs and Mitigation Measures for All Project Types

Deployment involving construction activities has the potential for occupational injury to telecommunications workers. Based on the analyses in Chapters 3 to 15, the impacts to human health and safety from the deployment and operation activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Utilized trained and licensed heavy equipment operators, when available or required;
- Develop site-specific Health and Safety Plans that identify all potential physical and chemical hazards present at the site, including historic contamination;
- Develop and utilize Standard Operating Procedures for site preparation activities and include description of work practice controls and administrative control;
- Ensure workers wear proper safety equipment, such as high visibility safety vests, hard hats, steel toe boots, gloves, eye protection, and hearing protection;
- Provide daily safety meetings to review activities, potential hazards, and safety objectives;
- Avoid site preparation work in areas with high vehicle traffic volume, such as road ROWs;
- Avoid site preparation work in areas known to contain environmental contamination or mines;
- Follow all applicable federal, state, and local requirements for hazardous materials and hazardous waste management;
- Incorporate all BMPs and mitigation measures listed in Section 9.4, Water Resources, for potential impacts to water quality–sedimentation, pollutants, nutrients or water temperature, and changes to groundwater or aquifer characteristics;
- Incorporate all BMPs and mitigation measures listed in Section 9.12, Air Quality;
- Incorporate all BMPs and mitigation measures listed in Section 9.2, Soils, for potential impacts from soil erosion;
- Conduct air and noise monitoring to ensure levels stay within health-protective levels for communities and workers, and, as required, that workers are trained and comply with personal protective equipment requirements as established by the Occupational Safety and Health Administration (OSHA);
- Search for the location of known contaminated sites prior to site section in the area where the Proposed Action site is being considered, for new or existing infrastructure projects;
- Ensure that appropriate measures are taken in compliance with applicable regulations (including Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act)[20] if construction occurs in an area where there is the potential for legacy contamination, to protect workers and the public from unacceptable levels of exposure to contaminants as a result of deployment activities;
- Establish an emergency response plan (including emergency preparedness and response activities, resources, and responsibilities) to attend to specific emergencies (e.g., accidental spills) that could arise during deployment;
- Ensure that reporting requirements are followed in the event that Emergency Planning and Community Right-to-Know Act reporting thresholds are reached for the shipping, handling or storage of gasoline or diesel used for equipment and generators;[21]

[20] The main objective of the Resource Conservation and Recovery Act of 1976 is to "protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner" (USEPA, 2015a). The Comprehensive Environmental Response, Compensation, and Liability Act or Superfund law, was designed to help clean up hazardous waste sites and releases of pollutants or contaminants that may negatively affect public health (USEPA, 2015b).

[21] The Emergency Planning and Community Right-to-Know Act of 1986 was designed to assist communities in planning for emergencies related to hazardous waste. The law also requires industry to inform federal, state, and local governments on the storage, use, and releases of hazardous chemicals: 75,000 gallons for gasoline; 100,000 gallons for diesel, and 10,000 pounds for all other hazardous chemicals (USEPA, 2015c).

- Establish a grievance mechanism or other stakeholder engagement tool that is accessible and culturally appropriate for use by the community to express concerns regarding the Preferred Alternative;
- Incorporate all BMPs and mitigation measures listed in Section 9.1, Infrastructure, on potential impacts to transportation system capacity and safety;
- As needed, implement community education and public awareness about the Preferred Alternative's traffic, routes used, road signage, and safety which are particularly critical in high-risk areas;
- Use signage to clearly mark construction sites and establish boundaries and barricades to keep people out of dangerous areas;
- Make sure an incident investigation procedure is in place that can be specifically used for any near misses or incidents involving workers and community members;
- Ensure all workers are appropriately trained in wildlife identification and hazard management to minimize the likelihood of wildlife attacks;
- Ensure all workers are appropriately trained in weather hazard management and equipped with all necessary personal protective equipment to avoid potential cold stress impacts such as hypothermia and frostbite or heat related hazards such as heat stroke;
- Incorporate all BMPs and mitigation measures listed in Section 9.13, Noise;
- Inform community members of dates and times of construction activities that are likely to generate noise at levels above 55 A-weighted decibels at the residences or workplaces of those individuals;
- Monitor land clearing and construction sites for areas of standing water, including ditches and holes in the ground, as well open receptacles (e.g., empty barrels) and fill or eliminate these hazards to prevent mosquito breeding; and
- Ensure that the appropriate medications are available for treatment of any infections that may arise in the workforce.

16.15.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

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First Responder Network Authority

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Nationwide Public Safety Broadband Network

Final Programmatic Environmental Impact Statement for the Southern United States

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Cooperating Agencies
Federal Communications Commission
General Services Administration
U.S. Department of Agriculture—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Commerce—National Telecommunications and Information Administration
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

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17. COMPARISON OF ALTERNATIVES

17.1. INTRODUCTION

This chapter presents in summary form impact ratings for the Preferred Alternative, as well as each of the remaining alternatives outlined in Section 2.2, Description of Alternatives.

Under the Preferred Alternative, FirstNet and its partner(s) would construct a nationwide broadband long term evolution (LTE) network using a combination of the wired, wireless, deployable, and satellite technologies. There is currently a wide range of technologies that FirstNet may use to implement and deploy the Nationwide Public Safety Broadband Network (NPSBN). Full descriptions of wired, wireless, and deployable projects that FirstNet may consider are explained in Section 2.1.2, Proposed Action Infrastructure.

Under the Deployable Technologies Alternative, FirstNet would procure, deploy, and maintain a nationwide fleet of mobile communications systems, including ground-based and aerial deployable technologies, to provide temporary coverage in areas not covered by existing, usable infrastructure. Generally, these units would be deployed at times of an incident to the affected area for either planned or unplanned incidents or events. Equipment would be stationed in every state and territory, often at multiple locations in each state or territory, to facilitate suitable response. These mobile communication units would be temporarily installed and may use existing satellite, microwave, or radio systems for backhaul.

Under the No Action Alternative, the NPSBN would not be constructed; there would be no nationwide, coordinated system dedicated to public safety interoperable communications. The existing multiplicity of communications networks would remain in place, as would the current, known limitations and problems of existing communication networks during times of emergency or disaster. This alternative would require an act of Congress to revise the Act, which currently requires the NPSBN.

This Draft Programmatic Environmental Impact Statement (PEIS) contains 15 stand-alone chapters, each of which is devoted to 1 of 13 states located in the U.S. South region. Each of these chapters describes the Affected Environment for 15 separate resource areas, such as biological resources, land use, air quality, etc., and discusses the potential impacts of the Proposed Action in an Environmental Consequences section.

Through the programmatic approach, FirstNet has identified four categories of potential impacts on these resources:

1. *Potentially significant;*
2. *Less than significant with Best Management Practices (BMPs) and mitigation measures incorporated;*
3. *Less than significant;* or
4. *No impact.*

Two exceptions exist to this categorization of impacts based on applicable, resource-specific regulations.

For threatened and endangered species and species of conservation concern, categories of impacts are defined as: *may affect, likely to adversely affect; may affect, not likely to adversely affect;* and *no effect*. These impact categories are comparable to those defined in the *Endangered Species Consultation Handbook* (USFWS and NMFS, 1998). In Table 17.2-1, the following numeric values have been assigned for the purpose of equivalency:

1. *May affect, likely to adversely affect*[1]*;*
2. *May affect, not likely to adversely affect;* or
3. *No effect.*

For cultural resources, categories of impacts are defined as an *adverse effect; mitigated adverse effect; effect, but not adverse; and no effect*. These impact categories are comparable to those defined in 36 Code of Federal Regulations (CFR) 800, Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS, 1983), and the U.S. National Park Service's *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (NPS, 1995). In Table 17.2-1, the following numeric values have been assigned for the purpose of equivalency:

1. *Adverse effect;*
2. *Mitigated adverse effect;*
3. *Effect, but not adverse;* or
4. *No effect.*

17.2. COMPARISON OF ALTERNATIVES

Table 17.2-1 presents impact ratings of the Preferred Action and Action Alternatives. Numerical ratings represent whole number averages of ratings across the states in the South region, rounded conservatively to err on the side of greater potential impact significance.

Evaluation of impacts was determined by the nature of both the deployment and operation of the infrastructure associated with each Alternative considered: the Preferred Alternative and the Deployable Technologies Alternative. The specific infrastructure associated with the Deployable Technologies Alternative would be the same as the deployable technologies implemented as part of the Preferred Alternative but would likely be implemented in greater numbers, over a larger geographic extent, and used with greater frequency and duration. The Deployable Technologies Alternative would not include fixed infrastructure, such as towers or buried or aerial fiber.

As a result, impacts associated with the Project Alternatives are generally similar. Both alternatives have impacts whose significance ranges from *no impacts* to *less than significant with BMPs and mitigation measures incorporated*; neither alternative has potentially significant impacts. For many resources, impact ratings are identical, although some differences exist for some resource areas. For example, the Preferred Alternative would have somewhat greater impacts than the Deployable Technologies Alternative to water resources, wetlands, and visual resources. Conversely, the Deployable Technologies Alternative would have somewhat greater

[1] For all impact ratings where potential affect is found, full and effective implementation of mitigation is assumed.

impacts than the Preferred Alternative to air resources. Again, neither alternative would have impacts that would be considered potentially significant.

The No Action Alternative would have no impacts, since by definition, the NPSBN would not be deployed and existing conditions would not change. As required by the National Environmental Policy Act, the No Action alternative is used as a baseline against which the impacts of the Action Alternatives are compared. However, the No Action Alternative would not achieve the project's stated purpose or meet the project need as required by Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Public Law [Pub. L.] No. 112-96, 126 Statute [Stat. 156 (2012)) (codified at 47 United States Code [USC] § 1401 et seq.); as such, it would require an act of Congress in order for the No Action Alternative to take place.

Table 17.2-1: Comparison of Alternatives by Resource Area and Type of Effect[2]

Resource Area/Type of Effect	Preferred Alternative		Deployable Technologies Alternative		No Action Alternative
	Deployment	Operations	Deployment	Operations	
Infrastructure					
• Transportation system capacity and safety	3	3	3	3	4
• Strain on capacity of local health, public safety, and emergency response services	3	3	3	3	4
• Modifies existing public safety response telecommunication practices, physical infrastructure, or level of service in a manner that directly affects public safety communication capabilities and response times	3	3	3	3	4
• Effects to commercial telecommunication systems, communications, or level of service	3	3	3	3	4
• Effects to utilities	3	3	3	3	4
Soils					
• Soil erosion	3	3	3	3	4
• Topsoil mixing	3	3	3	3	4
• Soil compaction and rutting	3	3	3	3	4
Geology					
• Seismic hazard	3	3	3	3	4
• Volcanic activity	3	3	3	3	4
• Landslide	3	3	3	3	4
• Land subsidence	3	3	3	3	4
• Mineral and fossil fuel resource impacts	3	3	3	3	4
• Paleontological resources impacts	3	3	3	3	4
• Surface geology, bedrock, topography, physiography, and geomorphology	3	3	3	3	4
Water Resources					
• Water Quality (groundwater and surface water)	3	3	3	3	4
• Floodplain degradation[a]	3	3	3	4	4
• Drainage pattern alteration	3	3	3	4	4
• Flow alteration	4	4	4	4	4

[2] While the analysis indicates that certain discrete locations could have higher impact ratings, this table is evaluating the potential regional impacts associated with the Proposed Action. Those potential impacts will be evaluated by FirstNet once the specific deployment locations are identified.

Resource Area/Type of Effect	Preferred Alternative		Deployable Technologies Alternative		No Action Alternative
	Deployment	Operations	Deployment	Operations	
• Changes in groundwater or aquifer characteristics	3	3	3	4	4
Wetlands					
• Direct wetland loss (fill or conversion to non-wetland), other direct and indirect effects[b, c]	3	3	3	3	4
Biological Resources					
• Terrestrial Vegetation	3	3	3	3	4
• Mammals	3	3[d]	3	3	4
• Marine Mammals	3	3	3	3	4
• Birds	3	3[e]	3	3	4
• Amphibians and Reptiles	3	3	3	3	4
• Invasive species effects	3	3	3	3	4
• Terrestrial Invertebrates	3	3	3	3	4
• Fisheries and Aquatic Habitat	3	3	3	3	4
Threatened and Endangered Species and Species of Conservation Concern[f]					
• Terrestrial Vegetation	2	2	2	2	4
• Mammals	2	2	2	2	4
• Marine Mammals	2	2	2	2	4
• Birds	2	2	2	2	4
• Amphibians and Reptiles	2	2	2	2	4
• Fisheries and Aquatic Habitat	2	2	2	2	4
Land Use, Airspace, and Recreation					
• Direct land use change	3	3	4	3	4
• Indirect land use change	3	3	4	3	4
• Use of airspace (at and near site of FirstNet facility installation or deployable base)	3	3	3	3	4
• Loss of access to public or private recreation land	3	3	4	3	4
• Loss of enjoyment of public or private recreation land	3	3	4	3	4
Visual Resources					
• Adverse change in aesthetic character	3	3[g]	3	3	4
• Nighttime lighting (overall)	3	3	3	3	4
• Nighttime lighting (isolated rural areas)	3	2	3	3	4
Socioeconomics					
• Impacts to real estate	3	3	4	4	4

Resource Area/Type of Effect	Preferred Alternative		Deployable Technologies Alternative		No Action Alternative
	Deployment	Operations	Deployment	Operations	
• Economic benefits or adverse impacts related to changes in tax revenues, wages, or direct spending (positive or negative)	3	3	3	3	4
• Employment	3	3	3	3	4
• Increased pressure on existing public services	3	4	4	4	4
• Diminished social cohesion/disruption related to influx	3	4	4	4	4
• Reduced opportunities for subsistence practices	3	4	4	3	4
Environmental Justice					
• Effects associated with other resource areas (e.g., cultural resources) that have environmental justice implications due to the affected parties (as defined by EO 12898)	3[h]	3	3	3	4
Cultural Resources [i]					
• Direct effects to historic properties[j]	3	3	3	3	4
• Indirect effects to historic properties	3	3	3	3	4
• Loss of access to historic properties	3	3	3	3	4
Air Quality					
• Increased air emissions	3	3	3	3	4
Noise					
• Increased noise levels	3	3	3	3	4
Climate Change					
• Contribution to climate change by GHG emissions	3	3	3	3	4
• Effect of climate change on Proposed Action-related impacts	3	3	3	3	4
Human Health and Safety					
• Potential exposure to hazardous materials	3	4	3	4	4
• Accidents and Injuries	3	3	3	3	4
• Exposure to Noise	3	3	3	3	4
• Communicable Disease	3	3	3	3	4

EO = Executive Order; GHG = greenhouse gas

[a] Because public safety infrastructure is considered a critical facility, Proposed Action activities should avoid the 500-year floodplain wherever practicable per EO 11988 and EO 13690.

[b] Indirect effects are those resulting from direct effects, but they occur elsewhere in space and/or time.

[c] Wetland functions include hydrologic, ecological, geomorphic, and social functions typically assessed for wetlands as part of USACE compensatory mitigation planning. Typical functions assessed may include flood attenuation, bank stabilization, water quality, organic matter input/transport, nutrient processing, wildlife habitat, threatened and endangered.

[d] Additional BMPs and mitigation measures will be required to further reduce potential impacts to bats.
[e] Additional BMPs and mitigation measures will be required to further reduce potential impacts to birds.
[f] Categories of impacts are defined as: *may affect, likely to adversely affect; may affect, not likely to adversely affect;* and *no effect*. These impact categories are comparable to those defined in the *Endangered Species Consultation Handbook* (USFWS and NMFS, 1998).
[g] Additional BMPs and mitigation measures may be required for towers.
[h] BMPs and mitigation measures may be required to address potential impacts to environmental justice communities at the site-specific level.
[i] Categories of impacts defined as an *adverse effect; mitigated adverse effect; effect, but not adverse; and no effect* are comparable to those defined in *36 Code of Federal Regulations (CFR) 800*, *Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation* (NPS, 1983), and the U.S. National Park Service's *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (NPS, 1995).
[j] Per the National Historic Preservation Act, a "historic property" is defined as any district, archaeological site, building, structure, or object that is either listed or eligible for listing in the National Register of Historic Places (NRHP). Cultural resources present within a project's Area of Potential Effect are not historic properties if they do not meet the eligibility requirements for listing in the NRHP. Sites of religious and/or cultural significance refer to areas of concern to Indian tribes and other consulting parties that, in consultation with the respective party(ies), may or may not be eligible for listing in the NRHP. These sites may also be considered traditional cultural properties (TCPs). Therefore, by definition, these significance criteria only apply to cultural resources that are historic properties, significant sites of religious and/or cultural significance, or TCPs. For the purposes of brevity, the term historic property is used here to refer to either historic properties, significant sites of religious and/or cultural significance, or TCPs.

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Final Programmatic Environmental Impact Statement for the Southern United States

VOLUME 14 - CHAPTER 18

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18. CUMULATIVE IMPACTS

The Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) implementing regulations require an assessment of a proposed action's cumulative impacts (40 Code of Federal Regulations [CFR] Parts 1500-1508). A cumulative impact is defined as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" (40 CFR §1508.7). Cumulative impacts can result from minor individual actions that collectively become major actions over time (40 CFR §1508.7). CEQ's guidance for considering cumulative effects states that NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant" (Council on Environmental Quality, 1997).

Section 18.1 presents the methodology used to evaluate cumulative impacts; Section 18.2 discusses other actions that may have cumulative effects when combined with the potential impacts from the proposed FirstNet deployment and operation activities. Section 18.3 identifies the cumulative impacts for the resource areas discussed in each state chapter.

18.1. CUMULATIVE IMPACTS METHODOLOGY

This section assesses the potential cumulative environmental impacts that may result from implementing the Proposed Action. FirstNet identified other projects that may be categorized as occurring in the past, present, and reasonably foreseeable future. Some of these projects were identified early based on FirstNet's awareness of the project, while others were discovered in the NEPA planning process through internet research.

Projects were selected projects using a number of different methods, such as:

- Reviewing actions recently proposed by other Federal agencies;
- Identifying relevant and current grant funding programs sponsored by the Federal government; and
- Reviewing projects recently proposed or implemented by public entities or private entities.

Cumulative impacts were assessed by resource area as impacts may arise from one or more actions, resulting in additive or interactive effects. CEQ reports that interactive effects may, in some cases, be countervailing (adverse cumulative effect is less than the sum of the individual effects) or synergistic (net adverse cumulative effect is greater than the sum of the individual effects) (Council on Environmental Quality, 1997).

It should be noted that while the direct impacts of some individual projects were considered, there is little quantitative data available for most of the projects listed in Table 18.2-1. An integral part of this analysis for potential cumulative impacts requires a review of whether impacts from the Proposed Action could contribute to ongoing or foreseeable resource trends. The cumulative impacts analyses assess those impacts resulting from both an Action Alternative and other past, present, and reasonably foreseeable future actions for each resource area. As a

quantitative analysis cannot be formalized, FirstNet assessed the potential cumulative impacts qualitatively.

18.2. PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE PROJECTS

CEQ defines a cumulative effect as "an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR § 1508.7). Direct and indirect effects of a Proposed Action are considered as part of cumulative effects, as are other past, present, or reasonably foreseeable (future) projects that are related in the sense that they may affect the same resource areas.

Table 18.2-1 lists projects that FirstNet identified that could result in incremental impacts to a number of resource areas when considering the Proposed Action. FirstNet identified projects initially in its review of recent NEPA documentation, during public scoping, and from internet research. Table 18.2-1 provides the project name, geographic location, sponsor, a brief project description, and the completion year, based upon readily available information.

Table 18.2-1: Past, Present, and Reasonably Foreseeable Future Projects

Name	Location	Sponsor	Brief Description	Completion Year
Public Safety Interoperable Communications (PSIC) Grant Program	Nationwide	Department of Commerce (DOC) National Telecommunications and Information Agency (NTIA) and Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA)	$1 billion (B) grant program to U.S. states and territories for the acquisition of, deployment of, or training for the use of interoperable communications systems that use (or enable interoperability with communications systems that use) reallocated public safety spectrum in the 764-776 megahertz (MHz) and 794-806 MHz bands. Grants were awarded for 6,750 projects, including the installation of 133 new freestanding and 11 new guyed towers, collocation of equipment at 2,710 existing towers and 2,710 existing facilities, 112.9 miles of fiber optic cable, more than 350 training events, and acquisition of over 75,000 radios.	2012
Broadband Technology Opportunities Program (BTOP)	Nationwide	DOC NTIA	$4.7B grant program to deploy broadband infrastructure in the U.S., expand public computer center capacity, and encourage sustainable adoption of broadband service. As of December 2015, 263 projects had completed their project activities, 17 projects remained in active status, and grant recipients had deployed more than 114,636 miles of new or upgraded network infrastructure.	Ongoing

Name	Location	Sponsor	Brief Description	Completion Year
Rural Utilities Service Broadband Initiatives Program (RUS/BIP)	Rural Areas Nationwide	U.S. Department of Agriculture (USDA)	$2.5B grant and loan program to expand access to broadband services in rural America. Of the original 320 BIP projects, 297 were for infrastructure, 4 for satellite broadband service support, and 19 for technical assistance (the majority of which went to tribal communities). As of March 2014, RUS estimated that 66,521 fiber miles and 5,468 wireless access points were installed through BIP infrastructure projects.	2015
Integrated Public Alert & Warning System (IPAWS)	Nationwide	DHS FEMA	IPAWS is a federal modernization program of the Nation's alert and warning infrastructure to protect life and property. IPAWS provides public safety officials the means to alert the general public about serious emergencies using the Emergency Alert System (EAS), Wireless Emergency Alerts (WEA), the National Oceanic and Atmospheric Administration (NOAA) Weather Radio, and other public alerting systems from a single interface. Proposed infrastructure work includes facility resiliency upgrades to radio stations, and power generation, fuel storage, and other provisions necessary to operate and maintain transmitter facilities for extended periods without access to commercial electrical power.	Undetermined

Name	Location	Sponsor	Brief Description	Completion Year
Commercial Wireless Service Providers	Nationwide	Major Wireless Service Providers	Expansion plans of commercial wireless service providers is proprietary business information. However, publicly available business forecasts from tower owners provide some information regarding the relative scale and expansion plans of wireless providers, compared to the current (November 2015) baseline. For example, in a recent market analysis (http://www.fiercewireless.com/story/america-tower-t-mobile-co-locating-gear-verizon-towers-we-bought/2015-08-12), it was reported that in February 2015 Verizon agreed to lease the rights to 11,324 of its towers and sell 165 additional towers to American Tower, and that the Verizon towers are, on average, 30% taller than other carrier towers that have been sold or leased over the last several years. Therefore, American Tower now has access to more space, to add network equipment from other carriers, such as T-Mobile, which is submitting co-location applications to deploy its 700 MHz A Block spectrum to increase its long-term evolution footprint to 300 million points of presence (POP) by end of 2015 (an annual increase of 10 million). The recent ownership transfer of nearly 12% of FCC-registered towers of one major wireless service provider, and a 3% annual increase of POPs for another major provider is evidence of continued high demand for existing and new telecommunication towers.	Continuing

18.3. SUMMARY OF CUMULATIVE IMPACTS

Assessing cumulative impacts for resource areas on a regional basis for unknown deployment activities at undetermined locations would be purely speculative at the programmatic level of this analysis. Therefore, the cumulative impacts analysis of individual resource areas focuses solely on those resource areas identified as having potential cumulative impacts. Table 18.3-1 provides a summary of the potential cumulative impacts by resource area.

Table 18.3-1: Summary of Potential Cumulative Impacts of FirstNet South Region Projects with Past, Present, and Reasonably Foreseeable Projects

Resource Area	Cumulative Impacts
Infrastructure	⊙○+
Soils	⊙○
Geology	⊙○
Water Resources	⊙○
Wetlands	⊙○
Biological Resources	⊙○
T&E Species and Species of Conservation Concern	⦸⊙○
Land Use, Recreation, and Airspace	⊙○
Visual Resources	⦸⊙○
Socioeconomics	⊙○+
Environmental Justice	⊙○
Cultural Resources	⊙○
Air Quality	⊙○
Noise	⊙○
Climate Change	⊙○
Human Health and Safety	⊙○+

LEGEND
⊗ = Potentially Significant Impact
⦸ = Less than Significant Impact with BMPs and Mitigation Measures Incorporated
⊙ = Less than significant
○ = No impact
\+ = Beneficial impact

REFERENCE

Council on Environmental Quality. (1997). *Considering Cumulative Effects Under the National Evironmental Policy Act.* Washington, D.C.: Executive Office of the President. Retrieved July 31, 2014, from http://ceq.hss.doe.gov/publications/cumulative_effects.html

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19. OTHER REQUIRED ANALYSES

In addition to the analyses discussed in the previous state chapters, the National Environmental Policy Act (NEPA) requires an additional evaluation of the potential impacts from the Proposed Action related to unavoidable adverse impacts, any irreversible or irretrievable commitment of resources, and the relationship between local short-term and long-term productivity.

19.1. UNAVOIDABLE ADVERSE IMPACTS

The Council on Environmental Quality (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR] §1502.16) require that an Environmental Impact Statement (EIS) evaluate the unavoidable adverse impacts from implementation of the Proposed Action. For this Proposed Action, the analysis indicates no significant or unavoidable adverse impacts are anticipated. Once site-specific project information is known, the potential for adverse impacts would be analyzed, as appropriate, in NEPA documentation tiered from this Programmatic EIS (PEIS).

19.2. IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

CEQ's NEPA implementing regulations (40 CFR §1502.16) require that an EIS review the potential impacts to irreversible or irretrievable commitments of resources resulting from implementation of the Proposed Action. An irreversible commitment of resources refers to the loss of resource use in the future, whereas irretrievable refers to the loss of a natural resource for harvest, production, or use. These resources are irretrievable in that they would be used for a single project instead of being used for multiple purposes. An irretrievable commitment of resources is the loss of resources that cannot be replaced, recovered, or reversed. An example of irreversible commitments of resources could be the conversion of wetlands or the loss of a protected species or a cultural resource; these would be considered permanent losses.

The Proposed Action could require an irretrievable commitment of natural and manmade resources from direct consumption of fossil fuels and construction materials, depending on the deployment activities. These resources include potential building materials used during construction or renovation; energy (gas or electricity) consumed during construction and operation of facilities using mechanical systems; and human labor to develop, construct, and operate the proposed FirstNet projects as these contractors would be unable to work on other projects, and may cause temporary increases in the cost of local labor, equipment, or materials. These are considered irretrievably committed because their reuse for some other purpose would be highly likely. Potential resource commitments are shown on Table 19.2-1.

Where any potential irreversible or irretrievable commitments of resources are identified, they would be addressed in project specific environmental compliance documentation.

Table 19.2-1: Summary of Irreversible and Irretrievable Commitment of Resources by Resource Area

Resource Area	Irreversible Impacts	Irretrievable Impacts	Explanation
Infrastructure	No	No	Short-term obstruction or temporary disruption to local infrastructure could occur during construction of deployment activities. There would be no long-term impacts to infrastructure.
Soils	Yes	Yes	Soil lost due to potential erosion would be an irretrievable loss. There could be an irreversible commitment of resources if an undisturbed land area is selected for deployment activities.
Geology	Yes	Yes	Removal or disturbance of paleontological resources (fossils) could create irreversible and irretrievable impacts.
Water Resources and Wetlands	No	No	Deployment activities are not expected to cause any impacts to existing waterbodies, wetlands, or to exceed water quality standards.
Biological Resources	Yes	Yes	Removal or disturbance of habitat could create irreversible and irretrievable impacts.
Land Use and Recreation	Yes	No	Land use required for the deployment activities could be an irreversible impact.
Visual Resources	Yes	Yes	Obstruction of scenic or cultural areas could occur from some angles, resulting in an irreversible and irretrievable loss of visual resources. In addition, the installation of lighting in rural areas may have irretrievable impacts to night skies.
Socioeconomic Resources	No	Yes	There could be an increased use of local contractors during construction activities, representing an irretrievable loss of workers during construction.
Environmental Justice	No	No	In general, Environmental Justice impacts across each state and the District would not include irreversible or irretrievable effects. Analyses of individual proposed projects should assess whether potential impacts to specific environmental justice communities include irreversible and/or irretrievable effects.
Cultural Resources	Yes	Yes	Removal or disturbance of previously unidentified cultural resources could result in irretrievable and irreversible impacts.
Air Quality	No	No	Project emissions are not expected to exceed federal or state air quality standards. Air quality would return to existing conditions after completion of deployment activities.
Noise	No	No	Short-term, temporary noise impacts may result during construction activities for deployment. There would be no long-term impacts to noise.
Climate Change	No	No	Greenhouse gas emissions are not expected to increase.
Human Health and Safety	No	No	Construction activities during deployment may increase human health and safety concerns. Any hazardous wastes would be disposed of properly. Conditions would return to normal after completion of deployment activities.

19.3. RELATIONSHIP BETWEEN SHORT-TERM AND LONG-TERM PRODUCTIVITY

CEQ's NEPA implementing regulations (40 CFR §1502.16) require that an EIS address the relationship between short-term use of the environment and the potential impacts of such use on the maintenance and enhancement of long-term productivity, particularly for beneficial uses. Such impacts can arise from choosing one action that could reduce the flexibility of pursuing other options in the future, or from selecting a specific parcel of land or other resource to a certain use that would not allow other uses to occur at the site. It is anticipated that implementation of the Proposed Action would not result in any impacts that would narrow the range of future beneficial uses of the environment because it would not pose any long-term risks to the health, safety, or the general welfare of public communities. See Chapter 16, BMPs and Mitigation Measures, for a listing of BMPs and mitigation measures that FirstNet and/or its partner(s) would require, as practicable or feasible, to avoid or minimize potential impacts.

FirstNet does not intend to alter the current uses of the environment. Project-specific environmental compliance reviews would be conducted to ensure all environmental laws are met. During those reviews, each project element and activity would be evaluated, and the potential long-term effects on productivity of each environmental resource area would be disclosed and discussed relative to potential trade-offs.

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B.A., Biology and Environmental Science, Boston University

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B.S., Interdisciplinary Engineering and Management, Clarkson University

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M.P.A., Public Affairs, Indiana University
B.A., Science of Earth Systems, Cornell University

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B.A., Political Science, Bates College

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Ph.M., Engineering, University of Cambridge
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B.A., Economics, Arizona State University

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Ph.D., English, University College Dublin
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B.A., English and Math, University College Dublin

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First Responder Network Authority



Nationwide Public Safety Broadband Network

Final Programmatic Environmental Impact Statement for the Southern United States

VOLUME 14 - CHAPTER 21

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Cooperating Agencies
Federal Communications Commission
General Services Administration
U.S. Department of Agriculture—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Commerce—National Telecommunications and Information Administration
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

August 2017

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21. DISTRIBUTION LIST

Federal Agencies

Federal Communications Commission

General Services Administration

U.S. Department of Agriculture, Rural Utilities Service

U.S. Department of Agriculture, U.S. Forest Service

U.S. Department of Agriculture, Natural Resources Conservation Service

U.S. Department of Commerce, National Telecommunications and Information Administration

U.S. Department of Defense, Department of the Air Force

U.S. Department of Energy

U.S. Department of Homeland Security

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Congresswoman Martha Roby
Congressman Mike Rogers
Congressman Robert Aderholt
Congressman Mo Brooks
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Congresswoman Terri Sewell

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Congressman Carlos Curbelo
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Senator David Perdue
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Congressman Drew Ferguson IV
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Congressman John Lewis
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Congressman Doug Collins
Congressman Jody Hice
Congressman Barry Loudermilk
Congressman Rick Allen
Congressman David Scott
Congressman Tom Graves

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Senator Rand Paul
Congressman James Comer
Congressman Brett Guthrie
Congressman John Yarmuth
Congressman Thomas Massie
Congressman Harold "Hal" Rogers
Congressman Garland "Andy" Barr

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Senator John Kennedy
Congressman Steve Scalise
Congressman Cedric Richmond
Congressman Clay Higgins
Congressman Mike Johnson
Congressman Ralph Abraham
Congressman Garret Graves

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Congressman Robert Pittenger
Congressman Patrick McHenry
Congressman Mark Meadows
Congresswoman Alma Adams
Congressman Ted Budd

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Senator Martin Heinrich
Congresswoman Michelle Lujan Grisham
Congressman Stevan "Steve" Pearce
Congressman Ben Luján

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Senator James Lankford
Congressman Jim Bridenstine
Congressman Markwayne Mullin
Congressman Frank Lucas
Congressman Tom Cole
Congressman Steve Russell

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Senator Tim Scott
Congressman Marshall "Mark" Sanford
Congressman Joe Wilson
Congressman Jeff Duncan
Congressman Trey Gowdy
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Congressman Tom Rice

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Senator Bob Corker
Congressman David "Phil" Roe
Congressman John "Jimmy" Duncan Jr.
Congressman Charles "Chuck" Fleischmann
Congressman Scott DesJarlais
Congressman Jim Cooper
Congresswoman Diane Black
Congresswoman Marsha Blackburn
Congressman David Kustoff
Congressman Steve Cohen

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Senator Ted Cruz
Congressman Louie Gohmert Jr.
Congressman Ted Poe
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Congressman Joe Barton
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Congressman Gene Green
Congresswoman Eddie Johnson
Congressman John Carter
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Congressman Filemon Vela
Congressman Lloyd Doggett
Congressman Brian Babin

State and Local Government Agencies

Alabama
Alabama Department of Conservation & Natural Resources
Alabama Department of Environmental Management
Alabama Historical Commission
Marine Environmental Sciences Consortium
State of Alabama Soil and Water Conservation Committee
Alabama Emergency Management Agency

Arkansas
Arkansas Historic Preservation Program
Arkansas Department of Environmental Quality
Arkansas Game and Fish Commission
Department of Arkansas Heritage
Arkansas History Commission
Arkansas Natural Resources Commission
Arkansas Department of Emergency Management

Florida
Florida Department of Environmental Protection
Florida Fish and Wildlife Conservation Commission
Florida Forest Service
Florida Division of Emergency Management

Georgia
Coastal Resources Division
Environmental Protection Division
Georgia Department of Natural Resources
State Parks and Historic Sites Division
Georgia Emergency Management Agency

Kentucky
Kentucky Division of Conservation
Kentucky Division of Environmental Analysis
Kentucky Department for Environmental Protection
Kentucky Historical Society
Kentucky Department for Natural Resources
Kentucky State Nature Preserves Commission
Kentucky Division of Emergency Management

Louisiana
Louisiana Department of Environmental Quality
Louisiana Division of Historic Preservation
Louisiana Department of Natural Resources

Louisiana (cont.)
Louisiana Department of Wildlife & Fisheries
Louisiana Office of Homeland Security and Emergency Preparedness

Mississippi
Mississippi Department of Environmental Quality
Mississippi Department of Wildlife Fisheries & Parks
Mississippi Emergency Management Agency

North Carolina
North Carolina Department of Environmental Quality
N.C. State Office of Historic Preservation
North Carolina Department of Natural and Cultural Resources
North Carolina Wildlife Resources Commission
North Carolina Emergency Management Division

New Mexico
New Mexico Energy, Minerals and Natural Resources Department
New Mexico Environment Department
New Mexico Department of Game and Fish
New Mexico State Historian
New Mexico Homeland Security and Emergency Management

Oklahoma
Oklahoma Environmental Quality Department
Oklahoma Historical Society
Oklahoma Department of Emergency Management

South Carolina
South Carolina Department of Archives and History
South Carolina Department of Natural Resources
South Carolina Emergency Management Division

Tennessee
Tennessee Department of Environment & Conservation
Tennessee State Parks
Tennessee Wildlife Resources Agency
Tennessee Emergency Management Agency

Texas
Texas Commission on Environmental Quality
Texas Historical Commission
Texas General Land Office
Texas Wildlife Services
Texas Commission on State Emergency Communications

American Indian Tribes

Alabama
Poarch Band of Creeks, AL

Florida
Miccosukee Tribe of Indians, FL
Seminole Tribe of Florida, FL

Louisiana
Chitimacha Tribe of Louisiana, LA
Coushatta Tribe of Louisiana, LA
Jena Band of Choctaw Indians, LA
Tunica-Biloxi Indian Tribe, LA

Mississippi
Mississippi Band of Choctaw Indians, MS

New Mexico
Jicarilla Apache Nation, NM
Kewa Pueblo (Santo Domingo Pueblo), NM
Mescalero Apache Tribe, NM
Ohkay Owingeh, NM
Pueblo of Acoma, NM
Pueblo of Cochiti, NM
Pueblo of Isleta, NM
Pueblo of Jemez, NM
Pueblo of Laguna, NM
Pueblo of Nambe, NM
Pueblo of Picuris, NM
Pueblo of Pojoaque, NM
Pueblo of San Felipe, NM
Pueblo of San Ildefonso, NM
Pueblo of Sandia, NM
Pueblo of Santa Ana, NM
Pueblo of Santa Clara, NM
Pueblo of Taos, NM
Pueblo of Tesuque, NM
Pueblo of Zia, NM
Pueblo of Zuni, NM

North Carolina
Qualla Boundary Reservation, Eastern Band of Cherokee Indians, NC

Oklahoma
Absentee-Shawnee Tribe of Indians of Oklahoma, OK
Alabama-Quassarte Tribal Town, OK
Apache Tribe of Oklahoma, OK
Caddo Nation of Oklahoma, OK
Cherokee Nation, OK
Cheyenne and Arapaho Tribes, OK
The Chickasaw Nation, OK
The Choctaw Nation, OK
Citizen Potawatomi Nation, OK
The Comanche Nation, OK
The Delaware Nation, OK
Delaware Tribe of Indians, OK
Eastern Shawnee Tribe of Oklahoma, OK
Fort Sill Apache Tribe, OK
Iowa Tribe of Oklahoma, OK
Kaw Nation, OK
Kanza Museum, Kaw Nation, OK
Kialegee Tribal Town OK
Kickapoo Tribe of Oklahoma, OK
Kiowa Tribe, OK
Miami Tribe of Oklahoma, OK
The Modoc Tribe of Oklahoma, OK
The Muscogee (Creek) Nation, OK
The Osage Nation, OK
Otoe-Missouria Tribe of Indians, OK
Ottawa Tribe of Oklahoma, OK
Pawnee Nation, OK
Peoria Tribe of Indians of Oklahoma, OK
Ponca Tribe of Oklahoma, OK
The Quapaw Tribe of Indians, OK
Sac & Fox Nation, OK
Seneca-Cayuga Tribe of Oklahoma, OK
Shawnee Tribe, OK
The Seminole Nation of Oklahoma, OK
Thlopthlocco Tribal Town, OK
Tonkawa Tribe of Indians, OK
United Keetoowah Band of Cherokee Indians, OK
Wichita and Affiliated Tribes, OK
Wyandotte Nation, OK

South Carolina
Catawba Indian Nation, SC

Texas

Alabama-Coushatta Tribe of Texas, TX
Kickapoo Traditional Tribe of Texas, TX
Ysleta Del Sur Pueblo of Texas, TX

Libraries

Alabama
Birmingham Central Library
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Downtown Huntsville Library
Ben May Main Library, Mobile
Juliette Hampton Memorial Library, Montgomery
Tuscaloosa Main Branch

Arkansas
Little Rock Library, Main Campus
Craighead County Jonesboro Public Library
Fayetteville Public Library
Pine Bluff Jefferson County Public Library
Fort Smith Public Library
Columbia County Library

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LeRoy Collins Leon County Public Library, Eastside Branch
Jacksonville Public Library, Main
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Tampa-Hillsborough County Public Library
John H Dickerson Heritage Library
Miami Beach Regional Library
Collier County Public Library

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Northwest Georgia Regional Library, Dalton-Whitfield
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Atlanta-Fulton Public Library System, Central Library
Columbus Public Library
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Lyon County Public Library, Eddyville Branch

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Itawamba County Pratt Memorial Library

North Carolina
Pack Memorial Library
Patrick Beaver Memorial Library
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Cumberland County Library, Cliffdale Regional Branch
Thomas H Leath Memorial Library
Durham County Library, Main Library
Onslow County Public Library

New Mexico
Santa Fe Public Library, Main Branch
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Roswell Public Library
Alamogordo Public Library
Carlsbad Public Library

Oklahoma
Ponca City Library
Soutar Memorial Library
Alimonte Library
Lawton Public Library
Tulsa City-County Library, Central Library
McAlester Public Library

South Carolina
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West Ashley Library
Williamsburg County Library, Kingstree

Tennessee
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Texas
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Mahon Public Library
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Fort Worth Central Library
Tom Green County Library, Stephens Central Library
Laredo Public Library, Bruni Plaza Branch
La Retama Central Library
Lyndon Baines Johnson Library
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Rosenburg Library

Media

Alabama
Birmingham Times
Dothan Eagle
Huntsville Times
Mobile Press-Register
Montgomery Advertiser
The Tuscaloosa News

Arkansas
Jacksonville Patriot
Arkansas Democrat-Gazette
The Northwest Arkansas Times
Times-Herald
Southwest Times Record
Harrison Daily Times
The Daily Citizen

Florida
The Daytona Beach News-Journal
The Gainesville Sun
Jackson County Times
El Nuevo Herald
Capital Soup
Tallahassee Democrat
The Florida Times-Union
Jacksonville Free Press
Orlando Sentinel
Miami Today
Tampa Bay Times
Sarasota Observer

Georgia
The Albany Herald
The Augusta Chronicle
Atlanta Daily World
Marietta Daily Journal
The Rockdale Citizen
The Telegraph
Savannah Morning News
The Atlanta Journal

Kentucky
The Courier-Journal
Commonwealth Journal
Lexington Herald-Leader
Mayfield Messenger
State Journal
Richmond Register
Tri-City News
Leader-News
The Kentucky Standard

Louisiana
The Independent
The Advocate
Daily Star
The Courier
The News-Star
New Orleans Tribune
Southwest Daily News
The Daily Comet
The Ouachita Citizen
Leesville Daily Leader
The American Press

Mississippi
The Bolivar Commercial
Jackson Advocate
The Clarion-Ledger
Daily Leader
Commercial Dispatch
Meridian Star
The Daily Corinthian
The Oxford Eagle
The Sun Herald
The Vicksburg Post
Mississippi Press

North Carolina
The News & Observer
The Charlotte Oberserver
Winston-Salem Journal
Asheville Citizen-Times
The Fayetteville Observer
News & Record
Star-News
Gaston Gazette
New Mexico
The Santa Fe New Mexican
Albuquerque Journal
Daily Times
Carlsbad Current-Argus
Guadalupe County Communicator
Deming Headlight
Mountain Mail
Northern Mexico Tribune
Roswell Daily Record
Rio Grande Sun
Santa Fe Times

Oklahoma
The Oklahoman
Ada Evening News
Alva Review-Courier
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Bartlesville Examiner-Enterprise
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Edmond Sun
The Enid News & Eagle
Lawton Constitution
Norman Transcript
Woodward News
Oklahoma Daily
The Stillwater News Press
Tulsa World

South Carolina
The Post and Courier
The Greenville News
The Herald
Columbia City Paper
The Beaufort Gazette
The Sumter Item
The Times and Democrat
The Sun News
The Island Packet
The Berkeley Observer
Free Times

Tennessee
The Tennessean
The Daily Post-Athenian
Chattanooga Times
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The Jackson Sun
Cleveland Daily Banner
Columbia Daily Herald
Knoxville News Sentinel
Kingsport Times-News

Texas
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El Paso Times
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Austin American-Statesmen
Lubbock Avalanche-Journal
The Monitor

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First Responder Network Authority



Nationwide Public Safety Broadband Network

Final Programmatic Environmental Impact Statement for the Southern United States

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Cooperating Agencies
Federal Communications Commission
General Services Administration
U.S. Department of Agriculture—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Commerce—National Telecommunications and Information Administration
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

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22. GLOSSARY

aeolian: An environment where wind is the major agent of sediment deposition.

agroecosystems: A land use management system in which trees or shrubs are grown around or among crops or pastureland.

agroforestry: A land use management system in which trees or shrubs are grown around or among crops or pastureland.

alluvial valleys: Valleys formed by rivers.

alluvium: A sediment (clay, silt, sand, and/or gravel) deposited by flowing streams in a river valley.

alvar: Open areas found naturally with a thin soil over limestone or marble bedrock; hosts a distinctive vegetation community that can include a number of rare plants.

ammonia slip: An industry term for ammonia passing through the Selective Catalytic Reduction system un-reacted. This occurs when ammonia is over-injected into gas stream, temperatures are too low for ammonia to react, or catalyst has degraded.

anadromous fish: Fish born in freshwater that migrate to the ocean to grow as adults and then return to freshwater to spawn.

anchialine pools: Enclosed, landlocked waterbodies or ponds with an underground connection to both fresh and salt water.

aquatic: Pertaining to water.

aquifer: An underground layer of water-bearing permeable rock, rock fractures, or unconsolidated sediments from which groundwater can be extracted using a water well.

attainment area: Any area that meets the national primary or secondary ambient air quality standard for the pollutant.

avifauna: The birds of a particular region, habitat, or geological period.

backhaul capacity: The ability of a network to transfer data from a radio base station or cell site to a larger core network. These connections are typically made via fiber optic cable and microwave technology.

benthic: Anything associated with or occurring on the bottom of a body of water.

binge drinking: More than five drinks on one occasion for adult men and more than four drinks on one occasion for adult women.

biology: The study of living organisms, divided into many specialized fields that cover their morphology, physiology, anatomy, behavior, origin, and distribution.

biophysical settings: Settings that represent the areas of vegetation that dominate a landscape without human disturbance.

bioretention: A structural storm water control measure that captures and temporarily stores storm water runoff using soils and vegetation in shallow basins or landscaped areas to provide enhanced removal of dissolved storm water pollutants, including nutrients, pesticides, organics, metals, and biological constituents.

biota: The flora and fauna of a region.

bivalve: An aquatic mollusk with a compressed body enclosed within a hinged shell.

bog: Wet, spongy ground with soil composed mainly of decayed vegetable matter.

boreal forest: Forests that consist primarily of spruces, pines, and larches.

breeding areas: Area utilized by a species during the reproductive phase of its life cycle and during the time that young are reared.

bycatch: Unintentional capture/injury/entanglement of unwanted species during commercial fishing (e.g., a shark captured in a seine net targeting salmon).

calcareous: Containing calcium carbonate, calcium, or limestone

candidate species: A species officially nominated for listing as threatened or endangered, according to the Endangered Species Act.

catadromous: "An organism which lives in fresh water and goes to the sea to spawn, such as some eels" (USEPA, 2015).

cays: Small, low-elevation, sandy islands on the surface of a coral reef.

chikungunya: A mosquito-borne disease.

cistern: An artificial reservoir, usually underground used to store water.

Class I Areas: National parks and wilderness areas in attainment or unclassifiable areas that exceed 5,000 acres in size and were in existence on August 7, 1977.

climate: Chemical changes in parent material occur slowly in low temperatures. However, hot temperatures evaporate moisture, which also facilitates chemical reactions within soils. The highest degree of reaction within soils occurs in temperate, moist climates.

commercial fishery: The whole process of catching and marketing fish and shellfish for sale.

confined aquifers: Layers of groundwater that are generally bound above and below with impermeable layers of rock or sediment. Unconfined aquifers are not bound by such layers.

congregatory: The behavior of gathering in groups.

coniferous: "Cone-bearing trees, mostly evergreens, that have needle-shaped or scale-like leaves. They produce wood known commercially as softwood" (USEPA, 2015).

coral bleaching: The stress response of corals releasing the photosynthetic plankton, known as Zooxanthellae.

critical habitat: "A designated area that is essential to the conservation of an endangered or threatened species that may require special management considerations or protection" (USEPA, 2015).

crustaceans: A group of freshwater and saltwater invertebrates with jointed legs and a hard shell of chitin (e.g., shrimps, crabs, lobsters, and crayfish).

decapods: Types of crustaceans. Common crustacean examples include crayfish, crabs, and lobsters.

deciduous: "Plants having structures that are shed at regular intervals or at a given stage in development, such as trees that shed their leaves seasonally" (USEPA, 2015).

degradation: "The reduction of the capacity of the environment to meet social and ecological objectives, and needs" (USEPA, 2015).

demersal: Species that live and/or feed on or near the sea floor.

dengue: A mosquito-borne disease.

depredating bird: A bird that causes resource damage, economic loss, or a threat to health and human safety.

dimension stone: Natural rock material quarried for the purpose of obtaining blocks or slabs that meet specifications as to size and shape.

direct effect: Effects that physically alter a historic property in some way.

ecoregion: "A relatively homogeneous ecological area defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables" (USGS 2013).

ecosystem: "An interactive system that includes the organisms of a natural community association together with their abiotic physical, chemical, and geochemical environment" (USEPA, 2015).

endangered species: Species of animals, birds, fish, plants, or other living organisms threatened with extinction by anthropogenic (manmade) or other natural changes in their environment as prescribed in the Endangered Species Act

endemic: Species that are only found in one area or region. Also, (of a disease or condition) regularly found among particular people or in a certain area.

energetic (climate change): Refers to strength and amplification in oscillations.

ephemeral stream: ephemeral streams carry water only as a result of precipitation (any time of year), and perennial streams carry water year round (under normal precipitation conditions).

epiphytic: Plants that live on or are attached to another plant.

erosion control blanket: Erosion control blankets are biodegradable or synthetic sheet-like materials that are rolled out onto disturbed areas to protect soil from wind and water erosion.

estuarine: Coastal areas where salt water from the sea mixes with rivers and streams, and may also be called bays, harbors, inlets, lagoons, or estuaries.

estuarine intertidal: Estuarine intertidal: Coastal areas usually semi-enclosed by land but have open partially-obstructed access to open ocean. Water is partially diluted by freshwater runoff.

ethnographic: The systematic study of people and cultures, generally designed to explore culture from the point of view of the subject of the study.

eutrophication: A process where waterbodies receive excess nutrients that stimulate excessive plant growth.

evapotranspiration: The sum of evaporation and plant transpiration from the Earth's land and ocean surface to the atmosphere.

exotic: "A non-native plant or animal introduced from another geographic area" (USEPA, 2015).

expansive soils: "Characterized by 'the presence of swelling clay materials' that absorb water molecules when wet and expand in size or shrink when dry leaving 'voids in the soil' " (Rogers, Olshansky, & Rogers, 2004).

extant: A species still in existence.

extinction: "The disappearance of a species from part or all of its range" (USEPA, 2015).

extirpated: Cease to exist in the geographic area of study.

fern allies: Plants similar to true ferns but have different leaf structures, if they have leaves at all.

forams: Single-celled organisms with shells.

fragmentation: "A process during which larger areas of habitat are broken into a number of smaller patches of smaller total area, isolated from each other by a matrix of habitats unlike the original habitat" (USEPA, 2015).

freshwater-lens systems: Systems where freshwater floats on saltwater, separated by a transition zone of brackish water, and is found in areas where groundwater is not held up by impermeable barriers.

frugivorous: Animals that eat primarily fruit.

furbearers: Mammal species traditionally trapped or hunter for their fur, such as marten, lynx, wolverine, and beaver.

geology: An interdisciplinary science with a focus on the following aspects of Earth sciences: geologic hazards and disasters, climate variability and change, energy and mineral resources, ecosystem and human health, and groundwater availability.

germanium: A mining byproduct associated with zinc production.

gestation: "The period in a female's life from conception to birth" (USEPA, 2015).

glacial: "Of or pertaining to distinctive processes and features produced by or derived from glaciers and ice sheets" (USEPA, 2015).

guts: Narrow coastal water channels usually subject to strong tidal currents flowing back and forth.

habitat: "The place where a population lives, including its living and non-living surroundings" (USEPA, 2015).

hard ground conditions: A hard site exists where noise travels away from the source over a generally flat, hard surface, such as: water, concrete, hard-packed soil, or other ground surfaces having a low porosity. These are examples of reflective ground, where the ground does not provide any attenuation. The standard attenuation rate for hard site conditions is 6 A-weighted decibels (dBA) per doubling of distance for point source noise (e.g., power generators, most construction activities, etc.) and 3 dBA per doubling of distance for line sources (e.g., highway traffic, conveyor belt, etc.).[1]

haulouts: Areas of land or ice where seals and walrus come ashore to rest, molt, or breed.

heavy drinking: More than two drinks per day for adult men and more than one drink per day for adult women.

herbaceous: Plants that do not have woody stems.

herbivorous: An animal that predominantly eats plants.

herpetofauna: Reptiles and amphibians of a particular region, habitat, or geological period.

hibernacula: Habitats within which animals hibernate or otherwise seek refuge for extended periods.

highly migratory: Pelagic, or open-water, species that have a wide geographic distribution, both inside and outside countries' 200-mile zones, and undertake migrations of significant but variable distances across oceans for feeding or reproduction.

historic property: A historic property is defined as any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register [of Historic Places], including artifacts, records, and material remains related to such a property or resource" (16 U.S.C. 470(w)(5)).

hookah: A basic form of surface-supplied diving in which the air supply is via a single hose.

hotspot: A location where plumes of hot rock rise from within the earth toward the surface. Lower pressures toward the surface allow rock to melt, which can result in molten rock, volcanism, and lava flows.

[1] Washington State Department of Transportation. 2015. *Biological Assessment Preparation for Transportation Projects - Advanced Training Manual*. Version 02-2015. February 2015. Accessed: June 2015. Retrieved from: <http://www.wsdot.wa.gov/Environment/Biology/BA/BAguidance.htm#manual>

human environment: The natural and the physical (e.g., structures) environment, and the association of people to those environments.

human health and safety: The existing environment for health and safety is defined by occupational and environmental hazards likely to be encountered during the construction, operation, and maintenance of towers, antennas, cables, utilities, and other equipment and infrastructure at existing and potential FirstNet telecommunication sites.

hydrology: "The way water moves and is distributed via precipitation, runoff, storage and evaporation" (USEPA, 2015).

ice floes: A sheet of floating ice where walrus calves are typically born.

Indian tribe: The National Historic Preservation Act of 1966 defines "an Indian tribe, band, nation, or other organized group or community, including a Native village, Regional Corporation or Village Corporation, as those terms are defined in section 3 of the Alaska Native Claims Settlement Act (43 U.S.C. 1602), which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians" (16 USC 470(w)).

indirect effect: Effects that are further removed in time or space and diminish some aspect of the historic property, but may not physically alter it.

inferred properties: "Soil properties inferred from the combined data of soil science and other disciplines (i.e., soil temperature and moisture regimes inferred from soil science and meteorology)" (NRCS, 2015).

infiltration basins: (also known as recharge basins) are considered a treatment BMP because they can remove pollutants from surface discharges by capturing the storm water runoff volume (typically, larger volumes than an infiltration trench) and infiltrating it directly to the soil rather than discharging it to an aboveground drainage system.

informed siting of Proposed Action features: Refers to the act of locating activities or features in areas that do not support listed species or their known habitats.

infrastructure: Consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure includes a broad array of facilities such as utility systems, streets and highways, railroads, airports, buildings and structures, ports, harbors, and other manmade facilities.

injurious: Any species or subspecies of animal, except game birds and game mammals, that is known to be harmful to agriculture, aquaculture, indigenous wildlife or plants, or constitute a nuisance or health hazard.

insectivorous: Animals that feed predominantly on insects.

intermittent stream: streams that carry water for part of the year (generally winter and spring)

invasive species: Introduced species that out-compete native species for space and resources.

island arc: A type of archipelago, typically of volcanic origin, with an arc-shaped alignment.

jurisdictional wetlands: wetlands that are found to be "waters of the U.S." per definitions presented in the Clean Water Act, and are thus under the jurisdiction of the U.S. Army Corps of Engineers.

juvenile: "Any member of a species that is not yet sexually mature" (USEPA, 2015).

karst: "Karst is a terrain with distinctive landforms and hydrology created from the dissolution of soluble rocks, principally limestone and dolomite. Karst terrain is characterized by springs, caves, sinkholes, and a unique hydrogeology." (USGS, 2015a)

Kona winds: Stormy, rain-bearing winds that blow over the Hawaiian Islands from the southwest or south-southwest in the opposite direction of trade winds. Kona winds occur when a low-pressure center is within 500 miles northwest of the islands. Although strong, Kona winds usually do not last for more than a day or so.

lagomorphs: Gnawing mammals that feed on plants and have fully furred feet and two pairs of incisors in the upper jaw.

landslide: Refers to processes that lead to the downhill movement of earth materials due to gravity and other forces.

land subsidence: The downward settling or sudden sinking of the Earth's surface.

land use/land cover: Refers to the use of land, as visible from the air (or satellites).

latte: Large limestone or basalt pillars topped with a capstone.

lava tubes: "Lava tubes are natural conduits through which lava travels beneath the surface of a lava flow." (USGS, 2015b)

leeward: On the side sheltered from the wind (downwind).

life cycle: The continuous sequence of development of an organism.

listed wildlife: Any animal listed as threatened or endangered by federal or state agencies.

littoral: Refers to shore or near-shore areas.

maintenance area: An area that was previously in nonattainment, but has met the national primary or secondary ambient air quality standards for the pollutant, and has been designated as in attainment.

mammal: "Warm-blooded vertebrates that give birth to and nurse live young; have highly evolved skeletal structures; are covered with hair, either at maturity or at some stage of their embryonic development; and generally have two pairs of limbs, although some aquatic mammals have evolved without hind limbs" (USEPA, 2015).

manganese nodules: Nodular concretions of manganese and iron oxides that occur on the ocean floor as a result of direct precipitation of minerals from seawater.

manholes: Access points in infrastructure (e.g., roads, rights-of-way) to underground water, sewer, and other utilities that may be used for telecommunications activities, especially in cities and urban areas, depending on the location of other utilities. In cities, power, water, and telecommunication lines are often co-located; if access is through a manhole in the street, that access will be used.

marine: "Any environment, from pond to ocean, in which plants and animals interact with the chemical and physical features of the environment" (USEPA, 2015).

marine debris: Any man-made object discarded, disposed of, or abandoned that enters the marine environment.

marine intertidal: Areas of open ocean associated with high energy coastline where the substrate is exposed and flooded by tides (Cowardin, Carter, Golet, & LaRoe, 1979).

masonry cement: Mix, typically of Portland cement, hydrated lime, and other materials, used to improve the water retention and workability of the cement in masonry work.

maternity roosts: Locations where bats congregate to birth and rear young. Maternity roosts are often located in trees, under manmade structures (e.g., bridges, rooftops, etc.), or in caves.

mesic: "Soil condition that is medium wet" (USEPA, 2015)

metamorphic processes: A process that involves profound physical and or chemical change in rocks due to heat and pressure.

montane: Mountainous areas.

moraine: "A hill-like pile of rock rubble located on or deposited by a glacier. An end moraine forms at the terminus of a glacier. A terminal moraine is an end moraine at the farthest advance of the glacier. A lateral moraine forms along the sides of a glacier" (NPS, 2000)

muskeg: North American swamp or bog consisting of a mixture of water and partly dead vegetation, frequently covered by a layer of sphagnum or other mosses.

Native Hawaiian: "Any individual who is a descendant of the aboriginal people who, prior to 1778, occupied and exercised sovereignty in the area that now constitutes the State of Hawaii" (16 U.S.C. 470(w)(17)).

Native Hawaiian organization: The National Historic Preservation Act of 1966 defines a Native Hawaiian organization as "any organization which serves and represents the interests of Native Hawaiians; has as a primary and stated purpose the provision of services to Native Hawaiians; and has demonstrated expertise in aspects of historic preservation that are significant to Native Hawaiians. The term includes, but is not limited to, the Office of Hawaiian Affairs of the State of Hawaii and Hui Malama I Na Kupuna O Hawai'i Nei, an organization incorporated under the laws of the State of Hawaii" (16 U.S.C. 470 (w)(18).

noise: A form of sound caused by pressure variations that the human ear can detect; often defined as unwanted sound.

nonattainment area: Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

noxious: "Any living stage (e.g., seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation, or navigation or the fish and wildlife resources of the United States or the public health" (Federal Noxious Weed Act of 1974) (USFS, 2016).

obligate: Means "by necessity". The dictionary definition is: 1. Restricted to one particularly characteristic mode of life.

ocean convergence zone: "The quasi-horizontal flow of a fluid toward a common destination from different directions. When waters of different origins come together at a point or along a line (convergence line), the denser water from one side sinks under the lighter water from other side. The ocean convergence lines are the polar, subtropical, tropical, and equatorial" (NASA, 2016).

orographic effect: A change in atmospheric conditions caused by a change in elevation, primarily due to mountains.

outwash: "Glacial outwash is the deposit of sand, silt, and gravel formed below a glacier by meltwater streams and rivers. An outwash plain is an extensive, relatively flat area of such deposits" (USEPA, 2015).

Pacific Plate: A tectonic plate located within portions of the Pacific Ocean.

paleontological resources: Fossils or the physical remains of plants and animals that have mineralized into or left impressions in solid rock or sediment.

palustrine wetlands: Wetlands that include all nontidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand.

parent material: The original geologic source material from the soil formed affects soil aspects, including color, texture, and ability to hold water.

passerines: An order of "perching" birds that have four toes, three facing forward and one backward, which allows the bird to easily cling to both horizontal and nearly vertical perches.

pelagic: Inhabiting the water column as opposed to being associated with the sea floor; generally occurring anywhere from the surface to 1,000 meters.

Peneaeid shrimp: A family of marine crustacean that includes some of the most commercially valuable species (e.g. tiger prawn).

perched groundwater: An aquifer that occurs above the regional water table, separated by an impermeable or relatively impermeable layer of rock or sediment.

perennial streams: Streams that normally have surface flow year-round in all or part of their course. Non-perennial streams are normally dry during part of the year.

permeability: A property of a material that allows liquids or gasses to pass through it.

phenology: The seasonal changes in plant and animal life cycles, such as emergence of insects or migration of birds.

photic zone: Zone within which light penetrates below the ocean surface.

physiography: Refers to the description of the Earth's landforms and surface features.

piggery: Pig farms.

plant associations: Plant communities of a specific type (or types) and geography (or geographies).

plateau: "An elevated plain, tableland or flat-topped region of considerable extent" (USEPA, 2015).

plutonic rocks: Rocks formed from cooling magma below the Earth's surface.

points of presence: Connections or access points between two different networks, or different components of one network.

population: "A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area" (USEPA, 2015).

Portland cement: Cement that is made from limestone and clay that turns to a paste and hardens with water.

predation: The relationship between two organisms of different species in which one of them acts as predator that captures and feeds on the other organism that serves as the prey.

prehistoric sites: The physical evidence of human activity that occurred prior to European contact.

Prevention of Significant Deterioration Increment: The maximum allowable increase in pollutant concentration that is allowed to occur above a baseline concentration for a pollutant.

prime farmland: Land that possesses the required characteristics for producing food, feed, fiber, and oilseed crops.

procellariiforms: An order of seabirds that includes albatrosses and petrels.

proposed species: Species that have been proposed in a Federal Register after the completion of a status review and consideration of other protective conservation measures.

public safety entity: An entity that provides public safety services.

public safety infrastructure: any infrastructure utilized by a public safety entity as defined in the Middle Class Tax Relief and Job Creation Act of 2012, including infrastructure associated with police, EMS, and fire services.

pupping grounds: Sites where marine mammals birth and rear their young.

radiative forcing index: Radiative forcing is the difference between the radiation absorbed by Earth and the energy reflected back to space.

recovery: "The partial or full return of a population or community to a condition that existed before the introduction of the stressor" (USEPA, 2015).

recreational fishery: Fishing when the catch is for personal use, pleasure, or competition.

rhus: A specific genus of vines, shrubs, or small trees native to temperate and warm regions.

riparian zone: Areas near wetlands, rivers, or streams.

rock ripping: The breakup and removal of rock material with heavy equipment, such as an excavator.

runup: The height the wave reaches above sea level before washing to shore.

rutting: "Indentations in soil from operating equipment in moist conditions or soils with lower bearing strength" (USFS, 2009).

sedimentary rocks: Rocks formed by the deposition of material at the Earth's surface and within bodies of water.

selective catalytic reduction: Add-on nitrogen dioxides control placed in the exhaust stream following the engine and involves injecting ammonia into the flue gas. The ammonia reacts with the nitrogen dioxides in the presence of a catalyst to form water and nitrogen.

sessile: Unable to move; attached to the substrate.

shield volcano: A volcano that is above the ocean surface, has broad and gentle slopes, and is composed of fluid basalt.

short ton: One short ton is equal to 2,000 pounds.

silt curtains: Floating barriers used in marine construction, dredging, and remediation to control silt and sediment to reach a body of water.

silt fences: Designed to trap sediment in the area where construction or soil disturbance is taking place to minimize or avoid soil erosion and sedimentation. They are often 2-to-3 feet tall and are buried 8-to-12 inches into the soil with stakes.

sink: Carbon sinks occur when natural processes absorb more carbon dioxide than they release. Examples of natural processes that serve as carbon sinks include forests, soils, oceans, and vegetation.

site fidelity: The tendency of an animal to return to a previously occupied location.

sky glow: The overall diffusion of artificial light into the sky.

soarers: Birds that fly to a considerable altitude and maintain elevation without moving their wings by using ascending air currents.

smolt: A young fish undergoing its first migration from freshwater to the ocean.

soft ground conditions: A soft site exists where noise travels away from the source over porous ground or normal unpacked earth capable of absorbing noise energy such as grass, trees, or other ground surfaces suitable for the growth of vegetation, such as farmland.

soil rut: A sunken track or groove made by vehicle or equipment activity.

sole source aquifer: An aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer.

species diversity: "An ecological measure of the variety of organisms present in a habitat" (USEPA, 2015).

storm water filtration: Storm water filtration structures use a filtering media (sand, soil, gravel, peat, or compost) to remove pollutants from storm water runoff.

stratovolcanoes: Also called "composite volcanoes" and consist of alternate layers of lava and other volcanic material such as ash.

stream reach: Any specified length of a stream.

submarine volcano: Volcanoes that occur beneath the ocean surface.

subsistence fishery: Fishing when the catch is shared and consumed directly by the families and kin of the fishermen, rather than being sold.

substrate: Material such as sand and cobble that is associated with or occurs on the bottom of a body of water.

subwatershed: USGS subwatershed refers to the USGS 12 digit hydrologic unit code (HUC12), which averages approximately 40 square miles, depending on the region.

succession: "The process by which a plant or animal community successively gives way to another until a stable state is reached" (USEPA, 2015).

suicide contagion: Direct or indirect exposure to suicide or suicidal behaviors within one's family, peer group, or media reports that can result in an increase in suicide or suicidal behaviors, especially in adolescents and young adults.

symbiont: Two organisms that live in symbiosis (mutually beneficial relationship) with one another. Algae species are symbionts with corals.

take: Defined differently by various federal and state regulations, but the most commonly accepted definition is that of the U.S. Endangered Species Act, which defines it as: "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct."

taxonomic group: A group of biological organisms that have shared characteristics.

taxonomy: Science of naming and classifying organisms or specimens.

tectonic plate: The solid pieces of rock (or earth) that collide, move apart, or slide past each other over geologic time.

tectonism: "Structure forces affecting the deformation, uplift, and movement of the earth's crust" (USGS, 2015c).

temperate forest: Forests that are found in regions with mild climates and receive heavy rainfall.

terrestrial: "Pertaining to the land" (USEPA, 2015).

threatened species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, as defined in the Endangered Species Act.

time: Soil properties are dependent on the period over which other processes act on them.

tonne: One tonne is a unit of measure in the International System of Units that is equivalent to 1 metric ton and equivalent to 1.1023 U.S. tons, which are also known as short tons.

topography: The unique features and shapes of the land (e.g., valleys and mountains).

total maximum daily load: Maximum pollutant amounts a waterbody can receive while still meeting water quality standards.

total radiative forcing: The difference between the visible light absorbed by Earth and the energy reflected back to space.

trachyte: A type of fine-grained volcanic rock.

traditional cultural property: A place "eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (NPS, 1995)

translocation: The capture, transport, and release or introduction from one location to another.

trophic structure: The way organisms utilize food resources leading to energy transfer within an ecosystem.

tsunami: Large ocean waves that form as a result of water displacement.

tundra: A vast, flat, treeless Arctic region of Europe, Asia, and North America in which the subsoil is permanently frozen.

turbidity: A measure of the clarity of a liquid. When many fine particles are suspended in water, the turbidity is high.

ultra-high Frequency: UHF band covers frequencies ranging from 300 MHz to 3000 MHz.

unclassified area: Any area that cannot be classified on the basis of available information as meeting the national primary or secondary air quality standard for a pollutant.

understory: "The layer of forest located underneath the canopy. Here, smaller trees and shrubs grow, replacing older trees as they die" (USEPA, 2015).

ungulates: Classification of mammals having hooves.

U.S. Exclusive Economic Zone: A 200-mile ocean boundary around the coastline of U.S. states and territories in which the U.S. asserts exclusive commercial fishing rights.

urban: Densely developed residential, commercial, and other non-residential areas.

vascular plants: Plants that possess conducting tissues to transport nutrients and water throughout the plant.

vector: An organism that carries and transmits an infectious pathogen to another living organism.

vernal pools: seasonal depressional wetlands that are ponded only during the wetter part of the year, also known as "ephemeral pools."

very high Frequency: VHF band covers frequencies ranging from 30 MHz to 300 MHz.

visual landscape: What observers can readily see from a given vantage point.

water resources: Surface waterbodies and groundwater systems, including streams, rivers, lakes, canals, ditches, estuarine waters, floodplains, aquifers, wetlands, and other aquatic habitats.

watershed: USGS watershed refers to the USGS 10 digit hydrologic unit code (HUC10), which averages approximately 230 square miles, depending on the region.

wetland alternation: Any changes where the area remains a wetland and is not lost or converted, but the impacts cause a change in the type of wetland or a decrease in wetland function.

wetland loss or conversion: The actual loss of wetland habitat due to fill or conversion to a non-wetland habitat.

wetlands: "Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (USEPA, 2015).

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First Responder Network Authority



Nationwide Public Safety Broadband Network

Final Programmatic Environmental Impact Statement for the Southern United States

VOLUME 14 - APPENDICES

Amanda Goebel Pereira, AICP
NEPA Coordinator
First Responder Network Authority
U.S. Department of Commerce
12201 Sunrise Valley Dr. M/S 243
Reston, VA 20192

Cooperating Agencies
Federal Communications Commission
General Services Administration
U.S. Department of Agriculture—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Commerce—National Telecommunications and Information Administration
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

August 2017

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APPENDIX A – INVITED COOPERATING AGENCIES

Agency	Organization 1	Organization 2	Address
Advisory Council on Historic Preservation			401 F Street, NW, Suite 308 Washington, DC 20001-2637
Environmental Protection Agency	NEPA Compliance Division	Office of Federal Activities	1200 Pennsylvania Avenue, NW Mail Code 2252A Washington, DC 20460
Executive Office of the President	Council on Environmental Quality		722 Jackson Place, NW Washington, DC 20503
Federal Communications Commission	Wireless Telecommunications Bureau	Spectrum and Competition Policy Division	445 12th Street, SW Washington, DC 20554
General Services Administration	Environment Division	Public Buildings Service	1800 F Street, NW Washington, DC 20405
U.S. Army Corps of Engineers	Planning and Review Division (USACE-CW-PB)		441 G Street, NW Washington, DC 20314-1000
U.S. Army Corps of Engineers	Regulatory Program		441 G Street, NW Washington, DC 20314-1000
U.S. Department of Agriculture	USDA Rural Development	Rural Utilities Service	1400 Independence Avenue, SW Mail Stop 1571, Room 2240 Washington, DC 20250-1571
U.S. Department of Agriculture	U.S. Forest Service		201 14th Street, SW Washington, DC 20250-1100
U.S. Department of Agriculture	Natural Resources Conservation Service		1621 N. Kent Street Arlington, VA 22209
U.S. Department of Agriculture	Farm Service Agency		1400 Independence Avenue, SW Washington, DC 20250
U.S. Department of Commerce	National Marine Fisheries Service	National Oceanic and Atmospheric Administration	1315 East West Highway Silver Spring, MD 20910
U.S. Department of Commerce		National Oceanic and Atmospheric Administration	1315 East West Highway Silver Spring, MD 20910

Agency	Organization 1	Organization 2	Address
U.S. Department of Commerce	National Weather Service	National Oceanic and Atmospheric Administration	1325 East West Highway Silver Spring, MD 20910
U.S. Department of Commerce	National Telecommunications and Information Administration		1401 Constitution Avenue, NW Washington, DC 20230
U.S. Department of Defense	Operational Environmental Planning and Readiness	Office of the Chief of Naval Operations	2000 Navy Pentagon Washington, DC 20350-2000
U.S. Department of Defense	Department of the Air Force		1260 Air Force Pentagon Washington, DC 20330-1260
U.S. Department of Defense	National Guard Bureau		111 South George Mason Drive Arlington, VA 22204
U.S. Department of Energy	Office of NEPA Policy and Compliance		1000 Independence Avenue, SW Mailstop GC-54 Washington, DC 20585
U.S. Department of Health and Human Services	Division of Emergency and Environmental Health Services	Centers for Disease Control and Prevention	Chamblee Building, Room 6007 Chamblee, GA 30341-3717
U.S. Department of Homeland Security	Office of Environmental Planning and Historic Preservation	Federal Emergency Management Agency	1800 South Bell Street Arlington, VA 22202
U.S. Department of Homeland Security	Office of Environmental Management	U.S. Coast Guard	2703 Martin Luther King Jr. Ave, SE Washington, DC 20593-7714
U.S. Department of Homeland Security	Environmental and Energy Division	U.S. Customs and Border Protection	1300 Pennsylvania Avenue, NW Washington, DC 20229
U.S. Department of Homeland Security	Sustainability and Environmental Programs		301 Seventh Street, SW Washington, DC 20528
U.S. Department of Justice	Natural Resources Section	Environment and Natural Resources Division	P.O. Box 7611 Washington, DC 20044
U.S. Department of Justice	Federal Bureau of Investigation		935 Pennsylvania Avenue, NW Room WB-460 Washington, DC 20535
U.S. Department of the Interior	Division of Environmental and Cultural Resources Management	Bureau of Indian Affairs	2051 Mercator Drive Reston, VA 20191

Agency	Organization 1	Organization 2	Address
U.S. Department of the Interior	Division of Decision Support, Planning, and NEPA	Bureau of Land Management	1849 C Street, NW Washington, DC 20240-0001
U.S. Department of the Interior	Policy and Administration, Water and Environmental Resources Office	Bureau of Reclamation	P.O. Box 25007 Denver, CO 80225
U.S. Department of the Interior	Environmental Planning and Compliance Division	National Park Service	P.O. Box 25287 Denver, CO 80225-0287
U.S. Department of the Interior	Office of Environmental Affairs	Office of Policy, Management, and Budget	1849 C Street, NW Washington, DC 20240-0001
U.S. Department of the Interior	Division of Migratory Bird Management	U.S. Fish and Wildlife Service	5275 Leesburg Pike Falls Church, VA 22041
U.S. Department of the Interior	Environmental Management Branch	U.S. Geological Survey	12201 Sunrise Valley Drive Reston, VA 20192
U.S. Department of the Interior	U.S. Fish and Wildlife Service		4401 North Fairfax Drive MS-800 Arlington, VA 22203
U.S. Department of Transportation	Office of Environment and Energy	Federal Aviation Administration	800 Independence Avenue, SW Washington, DC 20591
U.S. Department of Transportation	Office of Project Development and Environmental Review	Federal Highway Administration	1200 New Jersey Avenue, SE Washington, DC 20590
U.S. Department of Transportation	Office of Railroad Development	Federal Railroad Administration	1200 New Jersey Avenue, SE Washington, DC 20590

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APPENDIX B - SUMMARY SCOPING REPORT

First Responder Network Authority Nationwide Public Safety Broadband Network Programmatic Environmental Impact Statement

Scoping Summary Report

Overview

The First Responder Network Authority (FirstNet), an independent authority within the Department of Commerce (DOC), is preparing five regional Programmatic Environmental Impact Statements (PEIS) to evaluate the potential impacts of establishing of a nationwide, interoperable, public safety broadband network (NPSBN) based on a single national network architecture. Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Public Law No. 112-96, 126 Stat. 156 (codified at 47 U.S.C. 1401 *et seq.*) charges FirstNet with taking all actions necessary to ensure the building, deployment, and operation of NPSBN, by, at a minimum:

- Ensuring nationwide standards for use and access to the network;
- Issuing open, transparent, and competitive requests for proposals to the private sector;
- Encouraging use of existing commercial wireless infrastructure to speed deployment; and
- Managing and overseeing the implementation and execution of contracts or agreements with non-Federal entities to build, operate, and maintain the network.

FirstNet has determined that a PEIS is the appropriate level of environmental review under the National Environmental Policy Act of 1969 (NEPA). FirstNet will use the NEPA planning process to encourage agency and public involvement in the review of the proposed projects. Public involvement allows for full and fair discussion of the project scope and potential environmental impacts. By providing a means for open communication between FirstNet and the public, the procedural aspects of NEPA promote better decision-making.

The Council of Environmental Quality (CEQ) regulations (40 Code of Federal Regulation [CFR] Parts 1500-1508) provide guidance on opportunities for public participation. This report provides an overview of the FirstNet PEIS scoping activities, including the public scoping meetings and comments received during the comment period.

Public Notification

On November 12, 2014, FirstNet published a Notice of Intent (NOI) in the *Federal Register* to initiate a 45-day scoping comment period (79 Federal Register [FR] 67156). The NOI, provided in **Appendix A**, identified that FirstNet would be developing regional PEISs and solicited input from the public on potential concerns associated with the Proposed Action and purpose and need, and provided background information on the project. The NOI also included an announcement of PEIS scoping meetings. Issuance of the NOI commenced a 45-day public scoping period that ended on December 29, 2014.

FirstNet placed advertisements in local newspapers to invite the public to the scoping meetings identifying the dates and locations. Publication of the notices occurred in the following papers:

- Washington Post and Washington Post Express (November 23, 2014)
- Honolulu Star-Advisor(November 30, 2014)
- San Francisco Chronicle (November 30, 2014)
- Arizona Republic and Arizona Daily Star (November 30, 2014)
- Kansas City Star (December 7, 2014)
- The Times-Picayune (December 7, 2014)
- New York Times (December 14, 2014)

Copies of the newspaper notices are included in **Appendix B**.

Scoping Meetings

FirstNet held seven in-person scoping meetings throughout the nation. These meetings provided the general public and interested stakeholders opportunities to learn about the proposed action, talk directly with FirstNet environmental staff, and provide input regarding the scope of the analysis and alternatives. Organized as informal gatherings, the scoping meetings provided the public with an opportunity to learn about FirstNet, alternative ways to implement the NPSBN that will be analyzed in the PEISs, and the overall NEPA process, as well as provide comments and input to the FirstNet team. FirstNet held scoping meetings at the following locations:

- *Washington, D.C.* - Tuesday, November 25, 2014; 4-8 p.m.
  Department of Commerce lobby, 1401 Constitution Avenue NW, Washington, DC 20230
- *Honolulu, HI* - Tuesday, December 2, 2014; 4-8 p.m.
  Neal Blaisdell Center, 777 Ward Avenue, Honolulu, HI 96814
- *San Francisco, CA* - Thursday, December 4, 2014; 4-8 p.m.
  Holiday Inn Civic Center, 50 Eighth Street, San Francisco, CA 94103
- *Tucson, AZ* - Thursday, December 4, 2014; 4-8 p.m.
  Embassy Suites – Williams Center, 5335 E. Broadway Boulevard, Tucson, AZ 85711
- *Kansas City, MO* - Tuesday, December 9, 2014; 4-8 p.m.
  Kansas City University of Medicine and Biosciences, Classroom Annex Building, Classroom A, 1750 East Independence Avenue, Kansas City, MO 64106
- *New Orleans, LA* - Thursday, December 11, 2014; 5-9 p.m.
  Loyola University, Thomas Hall, 6363 St. Charles Avenue, New Orleans, LA 70118
- *New York, NY*- Monday, December 15, 2014; 4-8 p.m.
  New York University, Kimmel Center Grand Hall, 60 Washington Square South, New York, NY 10012

Each scoping meeting included a poster session that allowed individuals to review posters describing the proposed action, purpose and need, alternatives considered, geographic scope, and the NEPA process. The posters and handouts provided at the meetings are included in **Appendix C**. At each meeting, attendees could fill out a comment card and sign up for the distribution list.

Attendance lists from the meetings are included in **Appendix D**. A total of 19 people attended the seven scoping meetings. FirstNet received written comments from 48 individuals and organizations (one commenter submitted two comments). Table 1 provides the breakdown of comments received for each meeting and during the scoping comment period. Comments received both via U.S. Postal Service mail and electronically (email) were counted once as U.S. Postal Service.

Table 1. Summary of Scoping Period Comments Received

Comment Format	Number
Scoping Meetings	
November 25, 2014 (Washington, DC)	
Attendees	6
Written Comments	0
December 2, 2014 (Honolulu, HI)	
Attendees	0
Written Comments	0
December 4, 2014 (San Francisco, CA)	
Attendees	0
Written Comments	0
December 4, 2014 (Tucson, AZ)	
Attendees	2
Written Comments	0
December 9, 2014 (Kansas City, MO)	
Attendees	3
Written Comments	0
December 11, 2014 (New Orleans, LA)	
Attendees	4
Written Comments	1
December 15, 2014 (New York, NY)	
Attendees	4
Written Comments	0
Email	41
U.S. Postal Service Mail	7
Total Attendees	19
Total Comments	49

Summary of Comments

The public and local agencies raised several concerns during the scoping comment period. FirstNet reviewed the comments received and grouped them by resource area or PEIS topic. Table 2 summarizes the general concerns raised during scoping.

Table 2. Summary of Comments Received during Scoping

Issues/Concerns
• Agencies to provide FirstNet with State-specific environmental compliance information and points of contact
• Agencies to provide FirstNet with contacts within their local organizations and trade organizations
• Concern that placement of towers would impact historic/recreational/ecological study use of a specific area (i.e., new tower in Tucson, AZ at/on Tumamoc Hill or in/near the historic district)

Table 3 provides a summary of the comments received from federal agencies, state agencies, and local government organizations; comments are paraphrased and condensed from the actual comments. The environmental analysis included in the PEIS will rely on the full text of the comments as submitted. Copies of the comments received are included in **Appendix E. Appendix F** provides FirstNet responses to the comments received.

Table 3. Summary of Comments Received from Federal, State, and Local Government

Agency / Interest Group	Comment Summary
Federal Government	
U.S. Environmental Protection Agency, Region 9 (Ann McPherson)	• Notification of areas of particular concern, including impacts to water, air, biological resources, invasive species, and habitat protection. • Included information regarding suggested content for particular topics and resource areas.
State Government	
Virginia Department of Environmental Quality (Ellie Irons)	• Request for Federal Consistency Determination under the Coastal Zone Management Act
Virginia Department of Environmental Quality (Mark Alling)	• Water: ensure that construction best management practices will be used to avoid erosion and sedimentation; provide point of contact for wetland permits and for construction and stormwater permits • Waste: ensure that hazardous and solid waste be disposed of according to VA regulations; provide point of contact for hazardous and solid waste concerns
Local Government Organizations	
Orleans Parish Communications District (Catherine Cargo)	• Provide outreach to Neighborhood Empowerment Network Association (NENA), Association of Public-Safety Communications Officials (APCO), and their local chapters
Pima County, Arizona, District 5 Supervisor (Richard Elias)	• Concern that FirstNet activities may affect cultural resources in Tucson, AZ (i.e., Tumamoc Hill)

Appendix A: Notice of Intent

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Notices

Federal Register
Vol. 79, No. 218
Wednesday, November 12, 2014

This section of the FEDERAL REGISTER contains documents other than rules or proposed rules that are applicable to the public. Notices of hearings and investigations, committee meetings, agency decisions and rulings, delegations of authority, filing of petitions and applications and agency statements of organization and functions are examples of documents appearing in this section.

DEPARTMENT OF COMMERCE

Census Bureau

Proposed Information Collection; Comment Request; Survey of Housing Starts, Sales, and Completions

AGENCY: U.S. Census Bureau, Commerce.

ACTION: Notice.

SUMMARY: The Department of Commerce, as part of its continuing effort to reduce paperwork and respondent burden, invites the general public and other Federal agencies to take this opportunity to comment on proposed and/or continuing information collections, as required by the Paperwork Reduction Act of 1995.

DATES: To ensure consideration, written comments must be submitted on or before January 12, 2015.

ADDRESSES: Direct all written comments to Jennifer Jessup, Departmental Paperwork Clearance Officer, Department of Commerce, Room 6616, 14th and Constitution Avenue NW., Washington, DC 20230 (or via the Internet at *jjessup@doc.gov*).

FOR FURTHER INFORMATION CONTACT: Requests for additional information or copies of the information collection instrument(s) and instructions should be directed to Erica Filipek, U.S. Census Bureau, MCD, CENHQ Room 7K057, 4600 Silver Hill Road, Washington, DC 20233, telephone (301) 763–5161 (or via the Internet at *Erica.Mary.Filipek@census.gov*).

SUPPLEMENTARY INFORMATION:

I. Abstract

The U.S. Census Bureau plans to request a three-year extension of the current Office of Management and Budget (OMB) clearance of the Survey of Housing Starts, Sales and Completions, also known as the Survey of Construction (SOC). The SOC collects monthly data on new residential construction from a sample of owners or builders. The Census Bureau uses the Computer-Assisted Personal Interviewing (CAPI) electronic questionnaires SOC–QI/SF.1 and SOC–QI/MF.1 to collect data on start and completion dates of construction, physical characteristics of the structure (floor area, number of bathrooms, type of heating system, etc.), and if applicable, date of sale, sales price, and type of financing. The SOC provides widely used measures of construction activity, including the economic indicators Housing Starts and Housing Completions, which are from the New Residential Construction series, and New Residential Sales.

We sample about 1,700 new buildings each month (20,400 per year). We inquire about the progress of each building multiple times until it is completed (and a sales contract is signed, if it is a single-family house that is built for sale). For single-family buildings, we conduct an average of 8.17 interviews and for multifamily buildings, we conduct an average of 7.0 interviews. The total number of interviews conducted each year for single-family buildings is about 107,844 and for multifamily buildings is about 50,400. Each interview takes 5 minutes on average. Therefore, the total annual burden is 13,187 hours.

II. Method of Collection

The Census Bureau uses its field representatives to collect the data. The field representatives conduct interviews to obtain data.

III. Data

OMB Control Number: 0607–0110.
Form Number(s): SOC–QI/SF.1 and SOC–QI/MF.1.
Type of Review: Regular submission.
Affected Public: Individuals or households, business, or other for-profit institutions.
Estimated Number of Respondents: 20,400.
Estimated Time per Response: 5 minutes.
Estimated Total Annual Burden Hours: 13,187.
Estimated Total Annual Cost to Public: The estimated cost to the respondent is $404,841 based on an average hourly pay for the respondent of $30.70. This estimate was taken from the Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics Survey for 2013.
Respondent's Obligation: Voluntary.
Legal Authority: Title 13 U.S.C. 182.

IV. Request for Comments

Comments are invited on: (a) Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden (including hours and cost) of the proposed collection of information; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology.

Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval of this information collection; they also will become a matter of public record.

Dated: November 6, 2014.

Glenna Mickelson,

Management Analyst, Office of the Chief Information Officer.

[FR Doc. 2014–26734 Filed 11–10–14; 8:45 am]

BILLING CODE 3510–07–P

DEPARTMENT OF COMMERCE

National Telecommunications and Information Administration

First Responder Network Authority

[Docket Number: 141104926–4926–01]

RIN 0660–XC014

Notice of Intent To Prepare Programmatic Environmental Impact Statements and Conduct Scoping for the Nationwide Public Safety Broadband Network

AGENCY: First Responder Network Authority, National Telecommunications and Information Administration, U.S. Department of Commerce.

ACTION: Notice of Intent.

SUMMARY: The First Responder Network Authority ("FirstNet") announces its intent to prepare five regional

Programmatic Environmental Impact Statements ("PEISs") and conduct public scoping meetings to evaluate the potential environmental impacts of the proposed nationwide public safety broadband network. The specific locations, dates, and times for the scoping meetings will be announced on the FirstNet Web site, no later than one week prior to each meeting.

DATES: The scoping period for this notice will begin on the date of publication of this notice and will end December 29, 2014. Comments to this notice must be submitted on or before December 29, 2014.

ADDRESSES: The public is invited to submit written comments to this Notice. Written comments may be submitted electronically via email to *PEIScomments@firstnet.gov* or by mail (to the address listed in **FOR FURTHER INFORMATION CONTACT**). Comments received will be made a part of the public record and may be posted to FirstNet's Web site (*www.firstnet.gov)* without change. Comments should be machine readable and should not be copy-protected. All personally identifiable information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Amanda Pereira, NEPA Coordinator, First Responder Network Authority, National Telecommunications and Information Administration, U.S. Department of Commerce, 12201 Sunrise Valley Drive, M/S 243, Reston, VA 20192.

SUPPLEMENTARY INFORMATION: The Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. 112–96, Title VI, 126 Stat. 256 (codified at 47 U.S.C. 1401 *et seq.*)) (the "Act") created and authorized FirstNet to take all actions necessary to ensure the building, deployment, and operation of an interoperable, nationwide public safety broadband network ("NPSBN") based on a single, national network architecture. The Act meets a long-standing and critical national infrastructure need, to create a single, nationwide network that will, for the first time, allow police officers, fire fighters, emergency medical service professionals, and other public safety entities to effectively communicate with each other across agencies and jurisdictions.

The National Environmental Policy Act of 1969 (42 U.S.C. 4321–4347) ("NEPA") requires federal agencies to undertake an assessment of environmental effects of their proposed actions prior to making a final decision and implementing the action. NEPA requirements apply to any federal project, decision, or action that may have a significant impact on the quality of the human environment. NEPA also establishes the Council on Environmental Quality ("CEQ"), which issued regulations implementing the procedural provisions of NEPA (see 40 CFR parts 1500–1508). Among other considerations, CEQ regulations at 40 CFR 1508.28 recommend the use of *tiering* from a "broader environmental impact statement (such as a national program or policy statements) with subsequent narrower statements or environmental analysis (such as regional or basin wide statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared."

Due to the geographic scope of FirstNet (all 50 states, the District of Columbia, and five territories) and the diversity of ecosystems potentially traversed by the project, FirstNet has elected to prepare five regional PEISs. The five PEISs will be divided as follows:

East	Central	West	South	Non-contiguous
Delaware	Colorado	Arizona	Alabama	Alaska
District of Columbia	Illinois	California	Arkansas	American Samoa
Connecticut	Indiana	Idaho	Florida	CNMI
Maine	Iowa	Nevada	Georgia	Guam
Maryland	Kansas	Oregon	Kentucky	Hawaii
Massachusetts	Michigan	Washington	Louisiana	Puerto Rico
New Hampshire	Minnesota		Mississippi	U.S. Virgin Islands
New Jersey	Missouri		New Mexico	
New York	Montana		North Carolina	
Pennsylvania	Nebraska		Oklahoma	
Rhode Island	North Dakota		South Carolina	
Vermont	Ohio		Tennessee	
Virginia	South Dakota		Texas	
West Virginia	Utah			
	Wisconsin			
	Wyoming			

Once a PEIS is completed and a Record of Decision (ROD) is signed, the proposed FirstNet projects can begin to submit the site-specific environmental documentation to determine if the proposed project has been adequately evaluated in the PEIS or warrants a Categorical Exclusion, an Environmental Assessment, or an Environmental Impact Statement.

Dated: November 6, 2014.

Genevieve Walker,

Director of Environmental Compliance, First Responder Network Authority.

[FR Doc. 2014–26772 Filed 11–10–14; 8:45 am]

BILLING CODE 3510–TL–P

DEPARTMENT OF COMMERCE

National Telecommunications and Information Administration

First Responder Network Authority

Special Meeting of the First Responder Network Authority Board Finance Committee

AGENCY: First Responder Network Authority, National Telecommunications and Information

Appendix B: Newspaper Notice

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SUNDAY, NOVEMBER 23, 2014 The Washington Post The World A15

Made of mushrooms and wasp spit, the drone goes green

Students' plan could solve the mess made by crashing robots

BY RACHEL FELTMAN

A group of college students has created an environmentally friendly drone — think veggie leather.

Led by one of NASA's synthetic biology experts, the students made an unmanned aerial vehicle almost entirely out of biodegradable materials. After a crash, these little fliers would basically disappear.

Drones can be a great help in dealing with environmental issues, flying into protected wooded areas to count the surviving population of an endangered animal, or over remote coral reefs to assess their condition.

But sometimes they can turn into litter. If a drone goes down in a protected area, it might not be possible for anyone to retrieve the hunk of metal and plastic.

"I have colleagues who do remote sensing in sensitive areas, and there was a UAV lost for a couple months in an area you really wouldn't want to lose one in," said Lynn Rothschild of NASA's Ames Research Center.

Rothschild serves as an adviser for a team competing in the International Genetically Engineered Machine competition, and the issue of downed-drone litter seemed like a good one for her group to tackle.

"Normally I just give them free reign, but then there are 15 very bright students who all want to do 15 or 30 different things," she said. "So this year, I suggested an overall project. But they really just ran with it from there."

One of her students found a company called Ecovative Design that was growing the team's dream material. Blocks of fungal foam.

Mushrooms are made up of a structure called mycelium. It grows looking almost like a spider web when it's spread out, but it can grow to fit the confines it's placed in, eventually forming a tough chunk of foamy material. By putting mycelium into a mold filled with a tasty growing medium — like dead leaves or straw — you can create a custom-shaped mushroom block. Or in this case, a custom-shaped mushroom drone frame. A blast of heat kills the mycelium to stop its growth.

"You end up with this great material that just leftover fungal bits," Rothschild said.

To make the frame more durable, the students created a bioplastic to coat it.

You can make a kind of veggie leather using bacteria that create cellulose — the tough stuff that creates cell walls in plants. The bacterial cellulose is grown in a sheet and harvested, then wrapped around the mycelium frame. When it dries, it's tough and hard.

But the team's biohacking didn't stop there. They also harnessed the power of the insect world to keep their drone from dissolving in midair. The drone is covered in proteins cloned from paper wasp saliva, which the insects use to waterproof their nests.

For now, that's as far as the drone's biodegradability goes. It still uses a traditional rotor, battery and controls. But other researchers around the world are working on creating biodegradable versions of these components. Rothschild said. And her team is investigating the use of biological sensors, which would allow them to replace some of the sensors on the drone with bacteria.

"Eventually, I'd say that most, if not all, of the drone could be made from biological materials," she said.

Rothschild is excited about the ways the drone could be used in research on Earth, but she has bigger plans for them, too. She has already submitted a proposal to NASA to push this technology forward for Mars missions. The lightweight, unobtrusive, home-grown nature of the robots would make them perfect for use on the red planet.

More at washingtonpost.com/blogs/speaking-of-science

Islamic State kills tribesmen in Iraq

REUTERS

BAGHDAD — Islamic State militants have killed at least 25 members of a Sunni Muslim tribe in a village on the eastern edge of the provincial capital Ramadi, local officials said Saturday, in apparent revenge for tribal opposition to the radical Islamists.

They said the bodies of the men from the Albu Fahd tribe were discovered by the Iraqi army when it launched a counteroffensive against the Islamic State forces near the capital of Anbar province.

Last month, Islamic State fighters killed hundreds of members of the Albu Nimr tribe in Anbar in an attempt to break local resistance to their advances in the Sunni Muslim province they have largely controlled for nearly a year.

Islamic State, which has seized control of large parts of Syria and Iraq, continues to gain territory in Anbar despite three months of U.S.-led airstrikes.

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APPOINTMENTS PREFERRED

Interested in the Nationwide Public Safety Broadband Network?

You're invited to attend a public scoping meeting to start the environmental review of the First Responder Network Authority (FirstNet) Nationwide Public Safety Broadband Network (NPSBN).

November 25, 2014 from 4-8 PM
Department of Commerce lobby
1401 Constitution Ave NW
Washington, DC 20230

Drop by any time during meeting hours to get information and give input on the scope of this programmatic environmental study. Comments accepted via mail to Ms. Amanda Perera, NEPA Coordinator, FirstNet, 12201 Sunrise Valley Drive, M/S 243, Reston, VA 20192, or via e-mail to PEISComments@firstnet.gov through close of business December 29, 2014.

For more information, please visit www.firstnet.gov.

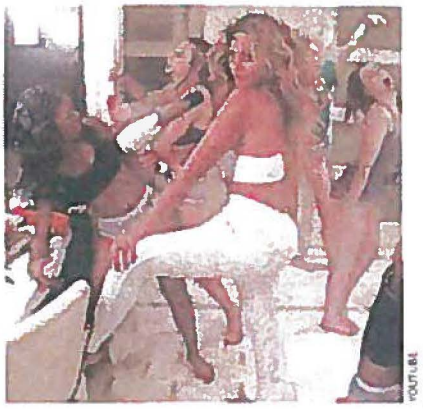
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could have been.



"The video is a low-budget, no frills look at the super-silly side of the hottest woman in entertainment."

NEHA PRAKASH AT MASHABLE.COM analyzes the music video dropped late Friday by Beyonce. For "7/11," a surprise single from the singer's four-disc Platinum Edition Box Set, due out today, the DIY-esque video features Beyonce twerking, doing the Harlem Shake and wearing a "kale" sweatshirt.



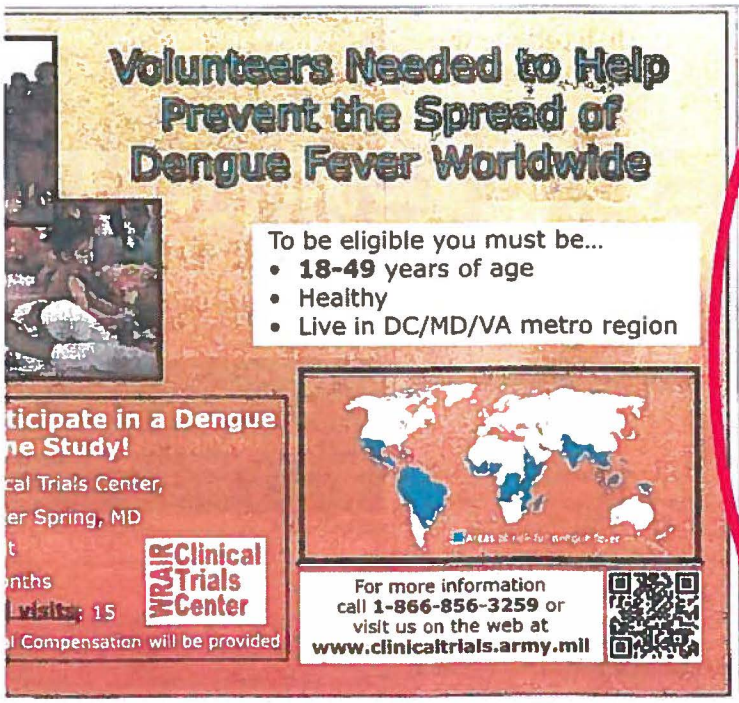
"That was one of the most disrespectful headlines I have ever read."

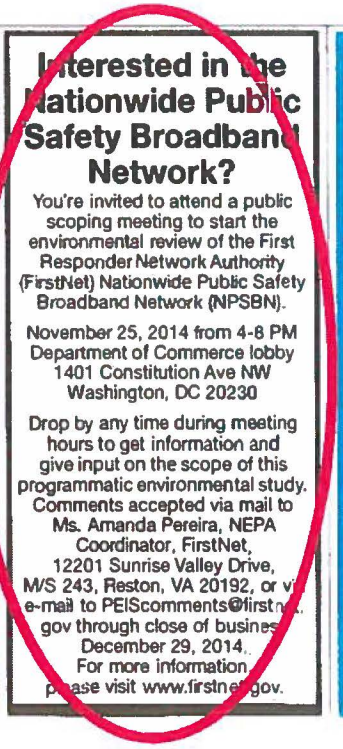
COMMENTER DERRICFROMDC AT TMZ.COM is outraged by celebrity news website TMZ's headline announcing the death of former D.C. Mayor Marion Barry. When TMZ posted the article Sunday morning, headlined "CRACK MAYOR DEAD AT 78," it prompted outrage on social media. A petition asking TMZ to apologize for and remove the distasteful headline garnered more than 10,000 signatures by Sunday evening.



"Can I just say how much I love that every single comment here is pointing out the superiority of the single blade razor?"

COMMENTER NATHAN LOFTIES AT FACEBOOK.COM finds the main takeaway of a photo posted last week by Gillette to its Facebook page. In honor of its 110th anniversary, the men's razor maker posted an image of its 1904 patent alongside the 2014 swiveled version. Instead of commending its innovation and how far the technology has come, most users spoke of their disappointment in the product's evolution.







AFFIDAVIT OF PUBLICATION

IN THE MATTER OF
Interested in the Nationwide Public Safety Broadband Network?

STATE OF HAWAII }
} SS.
City and County of Honolulu }

Doc. Date: DEC - 1 2014 **# Pages:** 1

Notary Name: Patricia K. Reese First Judicial **Circuit**

Doc. Description: Affidavit of Publication

Notary Signature — DEC - 1 2014 Date

PATRICIA K. REESE NOTARY PUBLIC Comm. No. 86-467 STATE OF HAWAII

Lisa Kaukani being duly sworn, deposes and says that she is a clerk, duly authorized to execute this affidavit of Oahu Publications, Inc. publisher of The Honolulu Star-Advertiser and MidWeek, that said newspapers are newspapers of general circulation in the State of Hawaii, and that the attached notice is true notice as was published in the aforementioned newspapers as follows:

Honolulu Star-Advertiser 1 times on:
11/30/2014

Midweek Wed. 0 times on:

_____ times on:

And that affiant is not a party to or in any way interested in the above entitled matter.

Lisa Kaukani

Subscribed to and sworn before me this 1ST day of December A.D. 2014

Patricia K. Reese, Notary Public of the First Judicial Circuit, State of Hawaii

My commission expires: Oct 07, 2018

Interested in the Nationwide Public Safety Broadband Network?

You're invited to attend a public scoping meeting to start the environmental review of the First Responder Network Authority (FirstNet) Nationwide Public Safety Broadband Network (NPSBN).

December 2, 2014 from 4-8 PM
Neal Blaisdell Center
Hawaii Suites 7 and 8 (located behind the box office)
777 Ward Avenue
Honolulu, HI 96814

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(SA692549 11/30/14)

PATRICIA K. REESE NOTARY PUBLIC Comm. No. 86-467 STATE OF HAWAII

Ad # 0000692549

SP NO : _____ L.N.

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SAN FRANCISCO CHRONICLE

Lori Gomez

Declares that:
The annexed advertisement has been regularly published In the

SAN FRANCISCO CHRONICLE

Which is an was at all times herein mentioned established as newspaper of general circulation in the City and County of San Francisco. State of California. as the term is defined by Section 6000 of the Government Code

SAN FRANCISCO CHRONICLE

(Name of Newspaper)

901 Mission Street

San Francisco. CA 94103

From 11/30/14

To 11/30/14

Namely on 11/30/14

(Dates of Publication)

I declare under penalty of perjury that the foregoing is true and correct

Executed on 12/4/14

At San Francisco. California

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December 4, 2014 from 4-8 PM
Holiday Inn Civic Center
50 Eighth Street
San Francisco, CA 94103

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Tucson, Arizona

STATE OF ARIZONA)
COUNTY OF PIMA)

Debbie Capanear, being first duly sworn deposes and says: that she is the Advertising Representative of **TNI PARTNERS,** a General Partnership organized and existing under the laws of the State of Arizona, and that it prints and publishes the Arizona Daily Star, a daily newspaper printed and published in the City of Tucson Pima County, State of Arizona, and having a genera circulation in said City, County, State and elsewhere and that the attached ad was printed and

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published correctly in the entire issue of the sai Arizona Daily Star on each of the following dates, to-wit:

NOVEMBER 30, 2014

Debbie Capanear

Subscribed and sworn to before me this 3 day of December, 2014

Lydia Fimbres
Notary Public

LYDIA FIMBRES
Notary Public - Arizona
Pima County
My Comm. Expires Oct 18, 2015

My commission expires

AD NO. 8316430

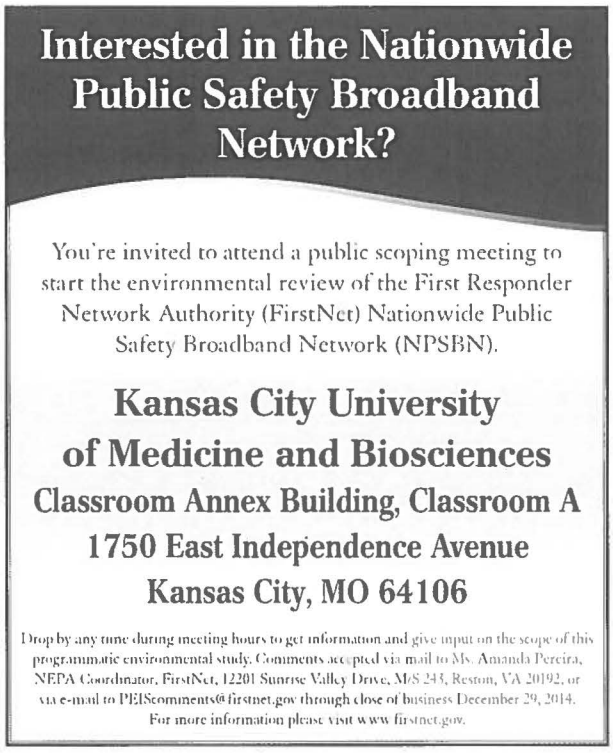
Interested in the Nationwide Public Safety Broadband Network?

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December 4, 2014 from 4-8 PM
Embassy Suites – Williams Center
5335 E. Broadway Blvd
Tucson, AZ 85711

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Publish November 30, 2014 • Arizona Daily Star



Interested in the Nationwide Public Safety Broadband Network?

You're invited to attend a public scoping meeting to start the environmental review of the First Responder Network Authority (FirstNet) Nationwide Public Safety Broadband Network (NPSBN).

Kansas City University of Medicine and Biosciences
Classroom Annex Building, Classroom A
1750 East Independence Avenue
Kansas City, MO 64106

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METRO AREA BRIEFS

Police arrest suspect in Algiers shooting death

New Orleans police have arrested the man they say fatally shot a 32-year-old man Sunday night in Algiers. Jeremie Bailey, 28, was picked up Wednesday at his mother's home in Marrero and booked with second-degree murder and aggravated battery. He is accused of killing Cornell Glover, according to police and court records. Authorities found Glover shot multiple times in the 3300 block of De Armas Street. Police credited "witness participation" with helping detectives Tenell Murdock identify Bailey as the suspected shooter. Bailey appeared in court Thursday, where records show his bond was set at $650,000.

Man found fatally shot in the 7th Ward

New Orleans police are investigating the shooting death of a man Saturday morning in the 7th Ward. The incident was reported around 7:30 a.m. in the 1500 block of North Roman Street. When officers arrived, they found a male student feet from fatally shot in the head, police said. Dozens of people gathered on the block. A young woman consumed with grief collapsed and wailed. "That can't be my husband," he screamed. He's never leaving." Homicide Detective Joseph Jefferson is investigating the murder. Anyone with information is asked to call Crimestoppers at 504 822 1111.

Victim ID'd in shooting near Tulane and Broad

Authorities on Friday identified the victim of a fatal shooting near New Orleans police headquarters. Ronald Rudolph, 51, was shot multiple times Thursday night in the 2600 block of Gravier Street, according to the Orleans Parish Coroner's Office. Police found Rudolph around 10:20 p.m. within a block of NOPD headquarters and the Orleans Parish Criminal District Court House. He was taken to a hospital, where he was pronounced dead. Several yellow evidence markers dotted the sidewalk in front of Gallatin Apartments, formerly home to the Fabulous Fox theater, as investigators searched for clues along Gravier. A group of four people lingered outside the yellow police tape, nervously eyeing the apparent brazenness of shooting someone so close to police headquarters. "How could you feel safe when this building has a million cameras, and police are right here?" mused one of the onlookers, who wished to remain anonymous. "How can that be safe?"

LaPlace man arrested for mailed marijuana

A LaPlace man has been placed on a charge of receiving a pound of high grade marijuana via the U.S. Postal Service, authorities said Friday. The marijuana was mailed from Los Angeles to a fictitious person at the 3200 block address and ended up at the Edgard post office, according to Wayne Strachan, the Capital Area Sheriff's Office's Detective Bureau commander. Strachan said a search warrant for the package. After 16 year old Alan Burl collected it, they executed the warrant, found the marijuana and arrested him. "Basically, the total street value was $5,000. But it's looked very well possessed with intent to distribute marijuana, driving on a suspended driver's license and driving without a rear view mirror. He remained on Tuesday Friday in lieu of a $50,750 bond.

Pedestrians targeted in armed robberies

New Orleans police are investigating three armed robberies that occurred over a four hour period Friday night. Around 9:30 p.m. in the 4700 block of Pleasure Street, two men age 14 and 15, demanding their property. The teens complied, according to NOPD's major offense report. Three hours later, two suspects in a vehicle approached a man in the 3400 block of Baronne Street, asking cash. The 36 year old victim gave up his money and the perpetrators fled, according to police reports. The last incident was reported at 8:59 p.m. at Iberville and Bourbon streets. Two suspects armed with guns demanded property from three women and a man, police said. The suspects took a purse from a 17 year old woman. Anyone with information is asked to call Crimestoppers at 504 822 1111.

Man wounded in drive-by

A 24 year old man was wounded in a drive by shooting on a Ninth Ward street Friday night, New Orleans police said. The incident was reported at 8:48 p.m. in the 1600 block of Seymour Street. The victim said a vehicle pulled up and fired on him. He was struck in the leg and taken to a hospital by car, police said. On Saturday morning, police would learn that the neighbor stood after a man was found dead in the 1500 block of North Roman Street. Anyone with information should call Crimestoppers at 504 822 1111.

Teen accused of shooting up porch in Kenner

A teenager Friday shot up just about everything on a Kenner man's porch except for his intended victim. Bullets struck the porch, the handrail, the garbage can and even the phone that the victim was holding, police said. The assault unfolded about noon in the 400 block of Walker Street. Police said a 75 year old man was sitting on his porch when Darren "D Way" Thomas, 19, Apt. C, 850 Rev. Richard Wilson Drive, Kenner, began shooting at him. Thomas fled but was eventually found about a half mile away in the 400 block of Farris Avenue and arrested. The victim and other witnesses identified him as the gunman, police said. They booked him with attempted second-degree murder. The gun was not found, but police said Thomas had fatally shot one for gunshot residue. They were still investigating the motive for the shooting.

Second suspect booked in Avondale burglary

The second suspect in an Avondale home burglary was identified Friday by the Jefferson Parish Sheriff's Office. Deputies are seeking Michael Smith Jr., 35, Apt. B, 145 Recile Blvd., Avondale. A Sheriff's Office spokesman said detective Steve Heggen had published a photo of Smith to a man and had been seen walking at Mann Lumber shop after selling property stolen during the burglary. Heggen would be the conversation after the Sheriff's Office was alerted an image from the pawn shop's surveillance camera, which generated tips from the public. The first suspect was Bryan Jolly, convicted of arson in March 3. Both were held at the Jefferson Parish Correctional Center. Anyone with information is asked to call 504 364 5400 or Crimestoppers Inc. at 504 822 1111.

Suspect nabbed blocks from store robbery

After a Kenner jewelry store was robbed Wednesday after noon, police chased down a suspect and arrested him four blocks away. They booked Tyson McGee, 31, of Apt. A, 1717 42nd St., Kenner, with simple robbery and resisting an officer. The robbery was reported at 4:45 p.m. at Rajpreets Jewelers, 4101 Williams Blvd. Police said a customer was looking at a silver dollar pendant behind the counter when he jumped over the counter, snatched the piece and ran out. Police said they found McGee running in the 1700 block of 42nd Street, chased him and arrested him.

Plaquemines drive-by strikes home, vehicle

Plaquemines Parish Sheriff's Office's arrest taking on early morning drive by shooting in the 400 block of Walker Road in Belle Chasse. At least two bullets were fired into a home, and a vehicle was struck, police said. No one was injured in the shooting. It is the second drive by shooting in a week in the parish. On Wednesday, an 18 year old Barataria man was located by sheriff's resident to a drive by shooting on Bootheville that left no injuries, according to Plaquemines Sheriff Jonnie Greco. Police ask anyone with information to call Crimestoppers at 504 822 1111.

— From staff reports

Algiers street improvements officially start

Project designed for greater safety

From staff reports

Improvements to Gen. de Gaulle Drive and Newton Street are just the beginning of a plan to rehabilitate Algiers roads, officials said Thursday.

Elected officials, business leaders and residents cut the ribbon on the $4 million Paths to Progress project designed to make streets safer and walkable, transit and bicycling.

About $15 million has been spent on Algiers streets in the past two to three years. Another $390 million is being spent on Gen. de Gaulle to address chronic flooding on the economic study's main evacuation route, said state Sen. David Heitmeier, D-Algiers.

More construction is coming. Work will begin on MacArthur Boulevard and Sullen Street in the next few months, Heitmeier said, and efforts are underway to find money to fix the Behrman Highway bypass where the ground for Somerset, Berkley and Huntley, said Mark Jernigan, New Orleans public works director.

"This is the beginning, far from the end," Heitmeier said. "When you're able to not have to hang your car in and get it aligned every week, it makes a difference. The streets are something that government can do."

State Rep. Jeff Arnold, D-Algiers, said the investment in infrastructure is paying off. He pointed to the newly expanded Algiers Plaza on Gen. de Gaulle and two new buildings under construction on a long vacant land on Gen. de Gaulle near Lapeer Drive.

"It's not a coincidence that you're see economic development starting to bloom," Arnold said. "The improvements coming on Gen. de Gaulle are spurring and giving confidence to those who want to reinvest in those properties."

The Paths to Progress program is a $30 million initiative to rehabilitate 10 street segments in New Orleans and Jefferson Parish. It is sponsored by the state Department of Transportation and Development, Federal Highway Administration, Regional Planning Commission and New Orleans.

Heitmeier thanked state Transportation Secretary Sherri LeBlanc Arnold and Regional Planning Commission Executive Director Walter Brooks for helping secure funding. "When you're dealing with limited resources and how to make things happen, it's really easy to say 'we can do something,'" Heitmeier said. "Secretary LeBlanc figures out how we can do it. She has a can-do attitude."

In the past five years, about $1.2 billion has been spent on infrastructure in Jefferson and Orleans, LeBlanc said. "The Paths to Progress is a testament of our continued commitment to this area," she said.

Gretna considers garage sale limits

Officials want them on weekends only

By Andrea Shaw
Staff writer

Complaints about garage sales lasting several days in residential neighborhoods have prompted Gretna officials to consider limiting the sales to Saturdays and Sundays.

An ordinance in the City Code up for its first reading Wednesday night would limit garage sales to two days per year at a home. Permits would be required, and the sales would be limited to 8 a.m. until 5 p.m.

Councilman Wayne Rau said some residents called public officials to complain about neighbors who had garage sales five or six days a week, which disrupted the quality of life. "We're trying to get some limits. We're trying to fight it and clean up the nuisance," he said.

Residents must still apply and pay a $25 fee for a permit, and only two permits are issued within a 12-month period, "per piece of residentially zoned property." They must be displayed prominently during set-up and the sale.

The proposed amendment also prohibits items from being purchased for the purpose of resale and bans garage sale signs from public property or taking utility poles.

Violators of the ordinance could be subject to jail and a $500 fine. The council meets Dec. 10 at 6:00 p.m. at City Hall Mary F. Long Avenue and Second Street.

• • • • • • •

Andrea Shaw can be reached at ashaw@nolacom or 504.826.3780.

Plans for pharmacy on Magazine Street met with mixed reactions

Sale of alcohol opposed by some

By Richard A. Webster
Staff writer

Plans to turn a vacant store space into what would be a Walgreens on Magazine Street into a CVS pharmacy have been met with opposition from nearby residents, the Uptown Messenger reports.

The corner building at Louisiana Avenue and Magazine Street has sat largely vacant since the recent wave of Black Banter Video closings, though the Subway sandwich shop and Green Tea Chinese Restaurant remain open on the Louisiana Avenue side of the building, according to the story. Now, CVS hopes to buy the building, demolish it completely and use the entire space for a pharmacy, said Louisiana Attorney Michael Sherman in a meeting with neighbors Tuesday evening.

Residents say they oppose the opening of another drug store in the neighborhood because there is already a Walgreens located a few blocks away. But their main objection is that CVS plans to sell alcohol.

"Sherman said the store would not sell any alcohol as staples for individual consumption, but neighbors said that the Walgreens down the street has a thriving business on agreement not to sell alcohol." The story reports. "If the CVS receives permission to sell alcohol, they said, the Walgreens will likely feel compelled to follow suit.

The City Planning Commission and the City Council must approve the proposal though no hearings have been scheduled

THE TV CROSSWORD



ACROSS

1. Role on "Person of Interest"
5. [illegible]
8. [illegible]
14. Beast of burden
15. Actress Lathan
16. Power in McCain ads
18. To ___, coach
20. Mrs. Mann
21. Adjoin, as Montana
24. Mark Hanna
28. Pres. Arthur's program
29. Actress Pennebaker
32. Joe opening
33. Across [illegible]
56. [illegible]
57. Dresses [illegible]
58. [illegible]

DOWN

1. Ran [illegible]
2. [illegible]
3. "___ and N. [illegible]" 2001 movie
4. [illegible]
5. "This Is the ___" 2013 James Ivory satire
6. Drives
7. One of the Watkins
8. "Get ___!"
11. Carol's friend
12. "___ the Wind" extra
13. "___ [illegible]
14. Org. for Brooks and Burns
20. Banker's building or idea
21. "___ Queen" role
22. "___ of Secrets" 2006 Vera Farmiga movie
23. [illegible]
24. "___ for a Pill" [illegible] and Darby movie
25. [illegible]
27. [illegible]
31. Actor Ving ___
32. Peasants' lord
34. Guiding principle
42. Letter before George
45. Store's permanent [illegible]

Hidato Sol.

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123	121	120	95	113	114	30	2	57	47	48	50
122	124	119	94	115	29	28	3	1	58	59	60
125	127	93	118	117	116	24	27	4	5	8	61
126	128	129	92	22	23	25	26	13	7	64	62
88	90	91	130	21	20	16	14	12	8	65	63
89	87	134	133	131	19	17	15	11	9	68	66
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		83	82	81	80	77	76	74	73	72	71

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You're invited to attend a public scoping meeting to start the environmental review of the First Responder Network Authority (FirstNet) Nationwide Public Safety Broadband Network (NPSBN).

December 11 2014 from 5-9 PM
Loyola University
Thomas Hall
6363 St. Charles Ave
New Orleans, LA 70118

Drop by any time during meeting hours to get information and give input on the scope of the programmatic environmental study. Comments accepted via mail to Ms. Amanda Perera, NEPA Coordinator, FirstNet, 12201 Sunrise Valley Drive, MS 243, Reston, VA 20192, or via e-mail to firstcomments@firstnet.gov through close of business December 29, 2014. For more information, please visit www.firstnet.gov.

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December 15, 2014 from 4–8 PM
New York University
Kimmel Center, Grand Hall
60 Washington Square South
New York, NY 10012

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5407-FEB 05

CERTIFICATION OF PUBLICATION

DEC 16 2014 20____

I, Alice Weber, in my capacity as a Principal Clerk of the Publisher of **The New York Times** a daily newspaper of general circulation printed and published in the City, County and State of New York, hereby certify that the advertisement annexed hereto was published in the editions of **The New York Times** on the following date or dates, to wit on

DEC 14 2014 20____

Alice Weber

Approved:

Maria Pannullo

THIS CERTIFICATION NOT VALID WITHOUT NYT RAISED SEAL

Appendix C: Scoping Meeting Posters and Handouts

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FirstNet
U.S. DEPARTMENT OF COMMERCE

Programmatic Environmental Impact Statement

What are the Project Alternatives?

Mixed Technologies Alternative:

FirstNet intends to construct a long-term evolution (LTE) nationwide public safety broadband network (NPSBN) using a combination of the following methods:

- Collocation of the network equipment on existing towers, poles and structures, some of which would require structural hardening or reinforcement to improve disaster resistance and resiliency;
- Construction of new communication towers, poles and associated structures to include generators, equipment sheds, fencing, and concrete pads;
- Collocation on existing fiber facilities, including lighting dark fiber and installation of new fiber on existing poles and in existing conduit;
- Installation of new conduit and fiber using trenching (including vibratory plowing) or directional boring (including horizontal directional drilling);
- Deployment of satellite phones and other portable satellite technology;
- Installation of microwave facilities for cell-site backhaul communication; and
- Utilization of deployable technologies to reach rural and remote areas. Deployable technologies encompass a range of items, generally characterized as the following:
  - Cell on Wheels (COW): a cellular base station on a trailer with an expandable antenna mast and usually a microwave or satellite link back to the main controller;
  - Cell on Light Truck (COLT): a cellular base station on a light truck platform with an expandable antenna mast and usually a microwave or satellite link back to the main controller;
  - System on Wheels (SOW): a full base station and controller on a trailer/truck/big rig/etc. A SOW is a fully self-contained cellular system that can provide an island system with no need for satellite/microwave link back; applicability of this type of deployable technology may be limited if there is no internet connectivity; and,
  - Deployable Aerial Communications Architecture: Aerial vehicles, including, but not limited to, drones, weather balloons, and blimps, which would be deployed at high altitudes and are capable of providing wide-area coverage, although with relatively low capacity/throughput.

Deployable Technologies Only Alternative:

Procure, deploy, and maintain a nationwide fleet of mobile communications systems to provide temporary coverage in areas not covered by existing, usable infrastructure, as there would be no collocation of equipment or new construction. Generally, these units would be deployed at times of an incident to the affected area. These mobile communication units would be temporarily installed and may use existing satellite, microwave, or radio systems for backhaul.

No Action Alternative:

Under the No Action Alternative, the Nationwide Public Safety Broadband Network (NPSBN) would not be constructed; there would be no nationwide, coordinated system dedicated to public safety interoperable communications. The existing multiplicity of communications networks would remain in place, as would the current, known limitations and problems of existing communication networks during times of emergency or disaster. This alternative would require an act of Congress to revise the Act, which currently requires the NPSBN.



FirstNet
U.S. DEPARTMENT OF COMMERCE

Programmatic Environmental Impact Statement

Description of the Project Area

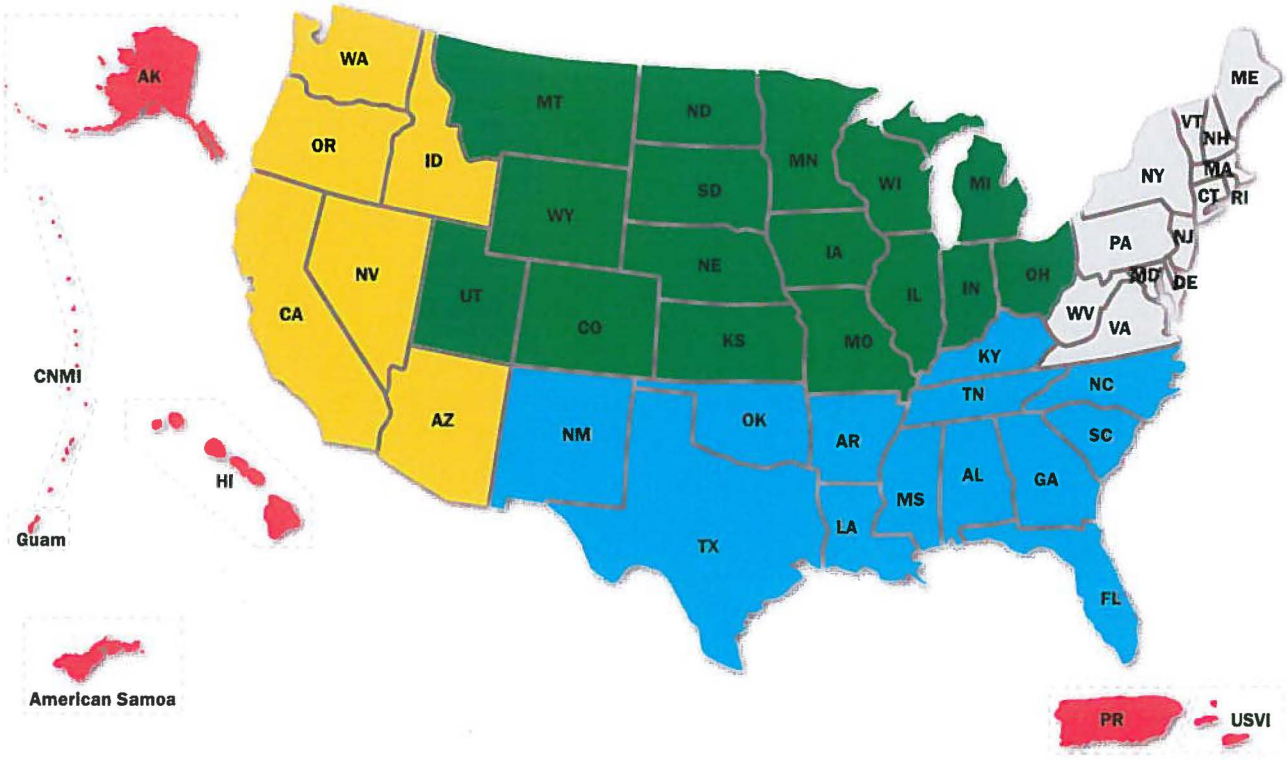
The FirstNet Programmatic Environmental Impact Statement project area would cover the geography of 50 states, 5 territories, the District of Columbia, and 566 tribal nations. Over the past 30 years, wireless operators have invested tens of billions of dollars in terrestrial networks covering over 60% of the U.S. land mass. The Nationwide Public Safety Broadband Network (NPSBN) is intended to provide nationwide service, including substantial rural milestones as part of each phase of the construction and deployment of the network.

FirstNet has determined that the design, construction, and operation of the NPSBN is a broad action with nationwide implications. This approach provides for the broadest and most extensive analysis in order to support the balancing of different considerations, including social, economic, and environmental issues. The programmatic approach creates a comprehensive analytical framework that assesses impacts expected from the NPSBN as a whole. It also supports any subsequent site-specific environmental analyses that may be required for individual actions at specific locations, once they are identified.

The programmatic approach allows FirstNet to identify and define three categories of actions: those types of actions that would not have a significant impact on the environment; those actions that would not have a significant impact if certain mitigation measures or best management practices are implemented; and those actions that will require site-specific analysis to determine the nature and extent of impacts.

The project area is divided into five regions:

- **East** – comprised of FEMA regions 1, 2, and 3 (with the exception of PR and USVI)
- **Central** – comprised of FEMA regions 5, 7, and 8
- **South** – comprised of FEMA regions 4 and 6
- **West** – comprised of FEMA regions 9 and 10 (except for AK and the Pacific Islands)
- **Non-Contiguous** – comprised of AK, HI, PR, USVI, CNMI, AS, and Guam



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U.S. DEPARTMENT OF COMMERCE

Programmatic Environmental Impact Statement

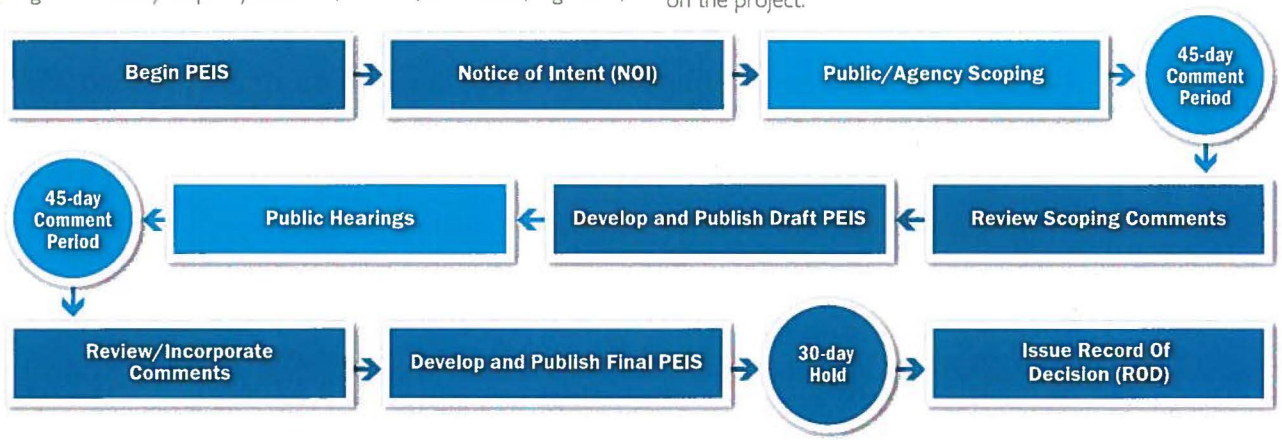
NEPA Process

The National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.) provides a framework to evaluate the impact of major federal actions on the environment and allows the public the opportunity to provide input on implementation alternatives. NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. NEPA also established the Council on Environmental Quality (CEQ). As part of the Executive Office of the President, CEQ coordinates federal environmental efforts and is responsible for advising the President on environmental policy matters. CEQ has also promulgated regulations implementing NEPA which are binding for all federal agencies. These regulations address the procedural provisions of NEPA and the administration of the NEPA process, including preparation of Environmental Impact Statements (EIS).

NEPA is applicable to all "major" federal actions affecting the quality of the human environment. A major federal action is an action with effects that may be major and which are potentially subject to federal control and responsibility. These actions may include new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals. FirstNet has determined the construction, operation, and maintenance of the Nationwide Public Safety Broadband Network (NPSBN) qualifies as a major federal activity under these criteria and triggers a NEPA review.

Because of this, FirstNet is required to comply with NEPA, which requires that the government examine the environmental, social, historic, and cultural impacts of its proposed actions before it irretrievably commits resources to undertake them. Furthermore, FirstNet must comply with its own NEPA implementing procedures, which were finalized and published in the Federal Register on April 29, 2014. On November 12, 2014, FirstNet published a Notice of Intent (NOI) to prepare five coordinated Programmatic Environmental Impact Statements (PEIS) in the Federal Register. The PEISs will analyze the direct, indirect, and cumulative impacts of the alternative approaches to the construction, operation, and maintenance of the NPSBN on natural, cultural, and social resources.

The NEPA process is depicted in the diagram below. The light blue coloring indicates those opportunities for the public to comment on the project.



The PEIS process started with publication of the Notice of Intent in the Federal Register on November 12, 2014. The scoping/public comment period for this PEIS will end on December 29, 2014.

Currently, the PEIS is at the scoping phase. During the scoping phase, a wide range of partners including the public, interest groups, and agencies at all levels of government are encouraged to provide input about the project. The PEIS will incorporate and build upon the prior planning efforts, environmental studies, and public input.

All of the collected information will form the basis for a range of alternatives to implement the project and eventually the selection of a preferred alternative.

The preferred alternative will be identified in the Draft PEIS when it is made available to the public for review and comment. A 45-day public comment period with public hearings similar to the scoping meetings will be held. The Final PEIS will incorporate comments received on the Draft PEIS. After publication of the Final PEIS, FirstNet will make the decision regarding the selection of an alternative within a Record of Decision.

FirstNet
U.S. DEPARTMENT OF COMMERCE

Programmatic Environmental Impact Statement

Public Involvement

The National Environmental Policy Act (NEPA) regulations require that a lead agency preparing an Environmental Impact Statement (EIS) is to involve the public, along with government agencies, American Indian tribes, private-sector organizations, and other interested parties in scoping (40 CFR 1501.7).

The public scoping process for the FirstNet Programmatic EIS (PEIS) began with publication of the Notice of Intent in the Federal Register on November 12, 2014. Scoping is the first phase of the NEPA analysis process and gives interested parties the chance to comment on the proposed action and to offer suggestions about the issues to be considered in the EIS analyses. Interested government agencies, American Indian tribes, private-sector organizations, and the general public are encouraged to participate in this scoping process. The scoping period will last for 45 days, ending on December 29, 2014. Written comments can be submitted either electronically or by paper copy. Information and public comments received during the Scoping Period will be reviewed for consideration in the development of each regional Draft PEIS.

To receive updates and announcements regarding the project and public involvement opportunities on this project, email *PEIScomments@firstnet.gov*.

Public Scoping Comment Period: November 12 to December 29, 2014

Scoping Meetings

FirstNet is holding scoping meetings in the following locations to obtain comments from the public:

- Tuesday, November 25: Washington DC, 4 – 8 p.m., EST
- Tuesday, December 2: Honolulu, HI, 4 – 8 p.m., HST
- Thursday, December 4: San Francisco, CA, 4 – 8 p.m., PST
- Thursday, December 4: Tucson, AZ, 4 – 8 p.m., MST
- Tuesday, December 9: Kansas City, MO, 4 – 8 p.m., CST
- Thursday, December 11: New Orleans, LA, 5 – 9 p.m., CST
- Monday, December 15: New York, NY, 4 – 8 p.m., EST

Each scoping meeting will provide an opportunity for the public to speak with subject matter experts and FirstNet staff. The scoping meetings are an open format, allowing the public to drop in at their convenience throughout the evening. Comments can be provided to FirstNet staff with a note taker present to transcribe their comments. In addition, attendees can provide their comments in writing at the meeting.

Submitting Comments

The public is invited to submit written comments for consideration during scoping. Written comments may be submitted electronically via email to ***PEIScomments@firstnet.gov***, in person using the comment forms provided at this scoping meeting, or by mail to:

Amanda Pereira, NEPA Coordinator
FirstNet
12201 Sunrise Valley Drive, M/S 243
Reston, VA 20192

Comments received will be made a part of the public record and may be posted to the FirstNet website without change. Comments should be machine readable and should not be copy-protected. All personally identifiable information (e.g., name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

How Are Scoping Comments Used?

Scoping for the Draft PEIS will provide several key elements to assist in the preparation of the document:

1. Gathering information and ideas from the public and key stakeholder groups, such as the public safety community, about the analytical issues related to the Nationwide Public Safety Broadband Network;
2. Making determinations about which issues should be analyzed; and
3. Identifying alternatives to the proposed action that should be considered for analysis.

The scoping process is ongoing and critical to informing federal agency actions, in that it begins before the PEIS analyses are initiated and continues throughout document development of the PEIS.

FirstNet
U.S. DEPARTMENT OF COMMERCE

Programmatic Environmental Impact Statement

What is the Proposed Action?

The purpose of the proposed action is to develop a nationwide, interoperable, public safety broadband network (NPSBN). The goal of FirstNet is to provide dedicated services that are comparable to or better than those services public safety has access to today through commercial broadband wireless carriers. These applications and services are intended to enhance the ability of the public safety community to perform more reliably, effectively and safely. FirstNet's goal is that the NPSBN would also provide a backbone to allow for improved communications by carrying high-speed data, location information, images, and, eventually, streaming video. This capability is intended to increase situational awareness during an emergency and improve the ability of the public safety community to effectively engage in those critical activities.









Description of the Proposed Action

The Proposed Action would encompass the design, construction, and operation of the NPSBN by FirstNet or a partner organization(s). By statute, the network must have several characteristics, including security, resiliency, backwards compatibility with existing commercial networks, integration with public safety access point (PSAPs) or their equivalents, substantial rural coverage, it must be built to open, non-proprietary, commercially available standards, and it must use existing infrastructure to the maximum extent economically desirable.

FirstNet intends to construct a core network, comprised of all standard Evolved Packet Core elements under the 3rd Generation Partnership Project (3GPP) standards (including the Serving and Packet Data Network Gateways, Mobility Management Entity, and the Policy and Charging Rules Function), device services, location services, billing functions, and all other network elements and functions other than the Radio Access Network (RAN). FirstNet expects to construct RAN networks that would consist of all cell site equipment, antennas, and backhaul equipment and services required to enable wireless communications with devices using the public safety broadband spectrum. In addition, FirstNet must continue to maintain and improve the NPSBN to account for new and evolving technologies.





The Promise of FirstNet

WHAT IS THE FIRST RESPONDER NETWORK AUTHORITY (FIRSTNET)?

FirstNet is an independent authority within the U.S. Department of Commerce's National Telecommunications and Information Administration. FirstNet is governed by a 15-member Board consisting of the Attorney General of the United States, the Secretary of Homeland Security, the Director of the Office of Management and Budget, and 12 members appointed by the Secretary of Commerce. The FirstNet Board is composed of representatives from public safety; local, state and federal government; and the wireless industry.

Signed into law on February 22, 2012, the Middle Class Tax Relief and Job Creation Act created FirstNet. The law gives FirstNet the duty to build, operate and maintain the first high-speed, nationwide wireless broadband network dedicated to public safety entities. FirstNet will provide a single interoperable platform for public safety communications.

WHAT WILL BE POSSIBLE WITH THE FIRSTNET NETWORK?

The FirstNet network will improve citizen and responder safety and increase the efficiency and effectiveness of emergency response through cutting edge broadband communications. Imagine a day when a single communications network can be used to dispatch EMS personnel, a medical helicopter, police officers, and fire personnel from different jurisdictions all at the same time, utilizing voice, video, and data at broadband speeds.

Public safety personnel using the FirstNet network will be able to share applications, access databases, and provide better informed responses to incidents through integrated communications.

FirstNet's goal is to provide public safety-grade reliability and nationwide coverage so all public safety personnel can count on the network when they are on the job. FirstNet is also aiming to provide coverage solutions that let public safety "take the network along" to the destination in certain geographies. FirstNet will create a nationwide standard of service while affording localized customization and control.

When the FirstNet network launches, it will provide mission-critical, high-speed data services to supplement the voice capabilities of today's Land Mobile Radio (LMR) networks. Initially, the FirstNet network will be used for sending data, video, images and text. The FirstNet network will also carry location information and eventually support streaming video. FirstNet plans to offer cellular voice communications such as Voice over Long Term Evolution (VoLTE) or other alternatives.

WHY WAS FIRSTNET CREATED?

The public safety community fought hard to fulfill the 9/11 Commission's last standing recommendation and lobbied Congress to pass legislation establishing a dedicated, reliable network for advanced data communications nationwide. During emergencies, public safety personnel need priority access and preemption, which are not available on commercial networks.

HOW WILL THE FIRSTNET NETWORK BENEFIT PUBLIC SAFETY?

Using the FirstNet network will improve situational awareness, decision-making and responder and citizen health and safety. Just as smartphones have changed personal lives, FirstNet devices and applications will ultimately change the way public safety operates. FirstNet devices will work anywhere on the network and will save time when seconds matter. A market of millions of public safety users will bring savings opportunities to state and local budgets. FirstNet will bring the benefits of a single, nationwide, interoperable network that is built to open standards to public safety agencies across the country. With millions of users on a single network, FirstNet can take advantage of increased vendor competition and economies of scale to drive down the final cost to the public safety user.

WHAT WILL USERS PAY FOR FIRSTNET'S SERVICES?

FirstNet intends to offer services at a compelling and competitive cost to attract millions of public safety users and make FirstNet self-sustaining. The use of FirstNet services and applications will be voluntary. The costs for FirstNet services and devices have not yet been set.

HOW WILL STATES AND AGENCIES PARTICIPATE IN THE BUILDOUT OF FIRSTNET?

The law that established FirstNet requires it to consult with regional, state, tribal and local jurisdictions to ensure that the FirstNet network is designed to meet the needs of public safety across the country. State consultation will be a collaborative process, involving key stakeholders and leadership from each state and territory, and will be iterative to allow for enhancements and improvements from the state and territory. FirstNet will work through the designated single officer or governmental body during consultation to gather requirements from key stakeholders for developing its deployment plan. Additional information on state consultation is available at http://firstnet.gov/consultation.

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PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Public Involvement

The public scoping process began with publication of the Notice of Intent in the Federal Register on November 12, 2014. Scoping is the first phase of the NEPA analysis process and gives interested parties the chance to comment on the proposed action and to offer suggestions about the issues to be considered in the EIS analyses. Interested government agencies, American Indian tribes, private-sector organizations, and the general public are encouraged to participate in this scoping process.

The scoping period will last for 45 days, ending on December 29, 2014. Written comments can be submitted either electronically or by paper copy. Information and public comments received during the scoping period will be reviewed for consideration in the development of each regional Draft PEIS.

Submitting Comments

The public is invited to submit written comments for consideration during scoping. Written comments may be submitted electronically via email to **PEIScomments@firstnet.gov** or by mail to:

Amanda Pereira, NEPA Coordinator
FirstNet
12201 Sunrise Valley Drive, M/S 243
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Comments received will be made a part of the public record and may be posted to the FirstNet website without change. Comments should be machine readable and should not be copy-protected. All personally identifiable information (e.g., name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.





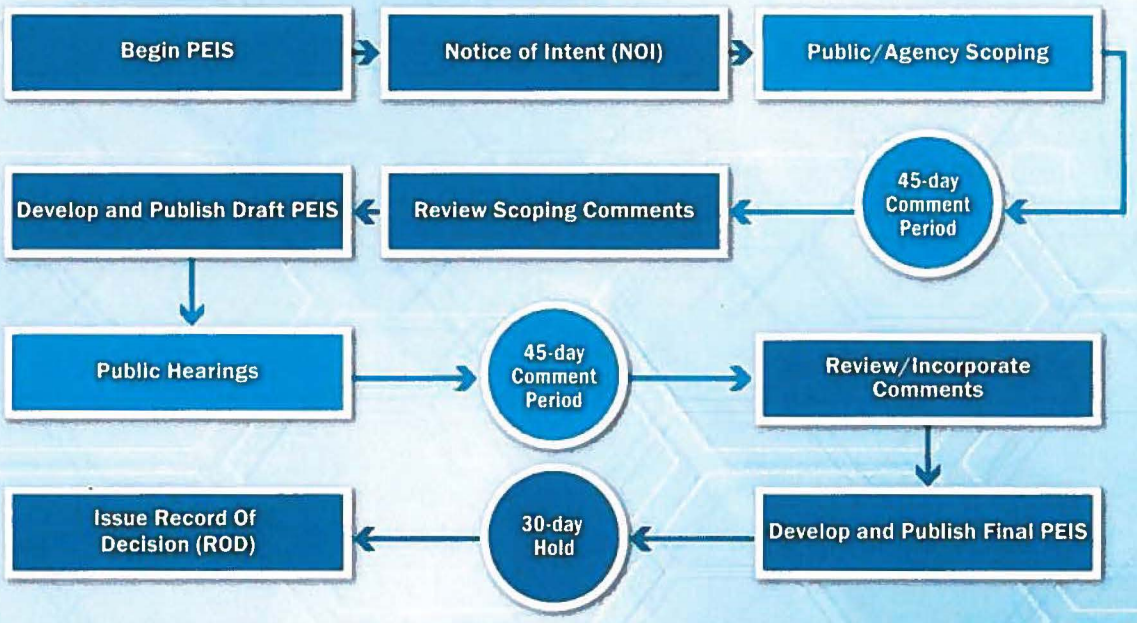

FirstNet
U.S. DEPARTMENT OF COMMERCE

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

What is NEPA?

The National Environmental Policy Act of 1969 (NEPA) provides a framework to evaluate the impact of major Federal actions on the environment and through the PEIS process, allows the public the opportunity to provide input on implementation alternatives.

The NEPA process is depicted in the diagram below. The light blue coloring indicates those opportunities for the public to comment on the project.



The PEIS process began with publication of the Notice of Intent in the Federal Register on November 12, 2014. The scoping/public comment period for this PEIS will end on December 29, 2014.

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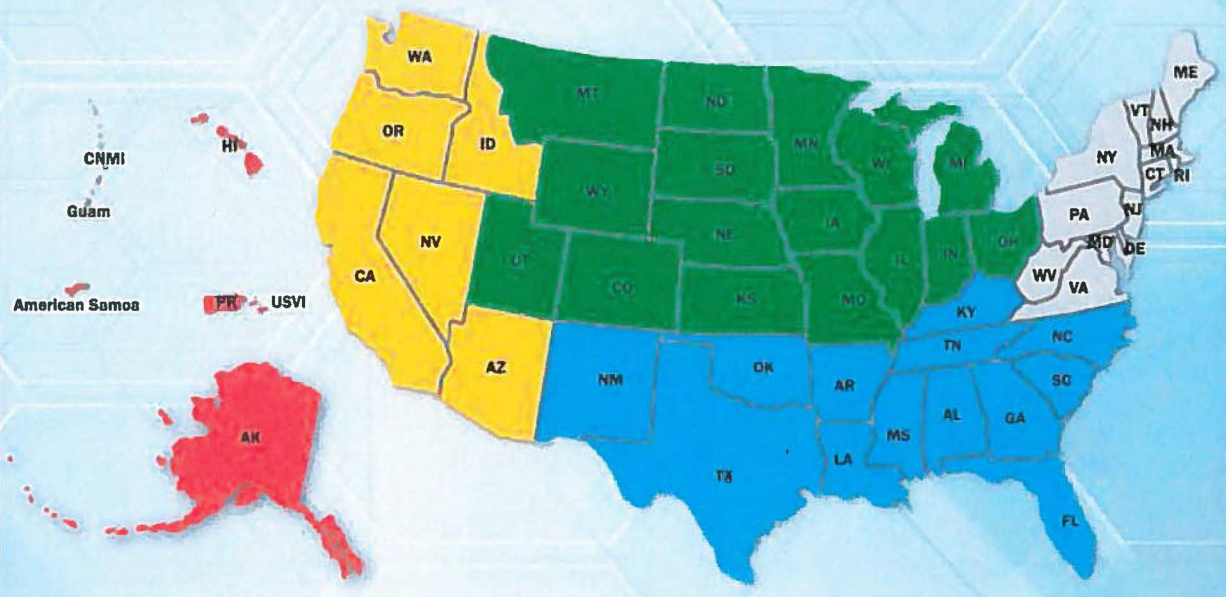
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Description of the Project Area

The FirstNet Programmatic Environmental Impact Statement project area would cover the geography of 50 states, 5 territories, the District of Columbia, and 566 Federally recognized tribes. Over the past 30 years, wireless operators have invested tens of billions of dollars in terrestrial networks covering over 60% of the U.S. land mass. The NPSBN is intended to provide nationwide service, and it is intended to include milestones that address wilderness and rural coverage gaps.

The project area is divided into five regions:

- **East** – comprised of FEMA regions 1, 2, and 3 (with the exception of PR and USVI)
- **Central** – comprised of FEMA regions 5, 7, and 8
- **South** – comprised of FEMA regions 4 and 6
- **West** – comprised of FEMA regions 9 and 10 (except for AK and the Pacific Islands)
- **Non-Contiguous** – comprised of AK, HI, PR, USVI, CNMI, AS, and Guam



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PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

What are the Project Alternatives?

Mixed Technologies Alternative:

Potential elements to be considered for the construction of a long-term evolution (LTE) nationwide public safety broadband network (NPSBN):

- Collocation of the network equipment on existing towers, poles and structures;
- Construction of new communication towers, poles and associated structures;
- Collocation on existing fiber facilities;
- Installation of new conduit and fiber using trenching or directional boring;
- Deployment of satellite phones and other portable satellite technology;
- Installation of microwave facilities for cell-site backhaul communication; and
- Utilization of deployable technologies to reach rural and remote areas, such as;
  - Cell on Wheels (COW)
  - Cell on Light Truck (COLT)
  - System on Wheels (SOW)
  - Deployable Aerial Communications Architecture: Aerial vehicles, including, but not limited to, drones, weather balloons, and blimps, which would be deployed at high altitudes and are capable of providing wide-area coverage, although with relatively low capacity/throughput.

Deployable Technologies Alternative:

Procure, deploy, and maintain a nationwide fleet of mobile communications systems to provide temporary coverage in areas not covered by existing, usable infrastructure, for deployment at times of an incident to the affected area. These mobile communication units would be temporarily installed and may use existing satellite, microwave, or radio systems for backhaul.

No Action Alternative:

Under the No Action, the NPSBN would not be constructed; there would be no nationwide, coordinated system dedicated to public safety interoperable communications. This alternative would require an act of Congress to revise the Act, which currently requires the NPSBN.

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PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

What is the Proposed Action?

The proposed action is to develop a nationwide, interoperable, public safety broadband network (NPSBN) with the goal of being comparable to or better than those services public safety has access to today through commercial broadband wireless carriers. These applications and services are intended to enhance the ability of the public safety community to perform more reliably, effectively and safely.

FirstNet's goal is that the NPSBN would also provide a backbone to allow for improved communications by carrying high-speed data, location information, images, and, eventually, streaming video. This capability is intended to increase situational awareness during an emergency and improve the ability of the public safety community to effectively engage in those critical activities.

Description of the Proposed Action

The Proposed Action would encompass the design, construction, and operation of the nationwide NPSBN by FirstNet or a partner organization(s). By statute, the network must have several characteristics, including security, resiliency, backwards compatibility with existing commercial networks, integration with public safety answering points (PSAPs) or their equivalents, substantial rural coverage, it must be built to open, non-proprietary, commercially available standards, and it must use existing infrastructure to the maximum extent economically desirable.

FirstNet intends to construct a core network, comprised of all standard Evolved Packet Core elements under the 3rd Generation Partnership Project (3GPP) standards, device and location services, billing functions, and all other network elements other than the Radio Access Network (RAN). FirstNet expects to construct RAN networks that would consist of all cell site equipment, antennas, and backhaul equipment required to enable wireless communications with devices using the public safety broadband spectrum.

Finally, the Act states that FirstNet must continue to maintain and improve the NPSBN to account for new and evolving technologies.

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Appendix D: Attendance Lists
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Appendix E: Comment Letters

Comment content included in Scoping Summary Report Appendix F. Actual letters, emails, and comment cards redacted to ensure privacy.

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Appendix F: Responses to Scoping Comments

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Date Rec'd	Format	Name	Organization	Topic	Comment	Response
11/18/2014	Mail	Ellie L. Irons	Commonwealth of VA - Department of Environmental Quality	RFI	Dear Ms. Pereira: This letter responds to the above Notice of Intent, which appeared in the November 12 Federal Register (Volume 79, Number 218) at pages 67156-67157 (hereinafter cited as "the Notice"). The Department of Environmental Quality ("DEQ") is responsible for coordinating Virginia's review of federal environmental documents prepared pursuant to the National Environmental Policy Act ("NEPA") and responding to appropriate federal officials on behalf of the Commonwealth. DEQ also coordinates Virginia's review of federal consistency determinations and certifications prepared pursuant to the Coastal Zone Management Act ("CZMA") and the Virginia Coastal Zone Management Program ("VCP"). DESCRIPTION OF PROPOSED ACTION According to the Notice, the First Responder Network Authority ("FirstNet") is a unit of the Department of Congress, created by the Middle Class Tax Relief and Job Creation Act of 2012 (Public Law 112-96, codified at Title 47, United States Code sections 1401 et seq.) and authorized to "take all actions necessary to ensure the building, deployment, and operation of an interoperable, nationwide public safety broadband network." The network is intended to "allow police officers, fire fighters, emergency medical service professionals, and other public safety entities to effectively communicate with each other across agencies and jurisdictions." (Notice, page 67157, center column). According to the Notice, FirstNet will prepare five regional Programmatic Environmental Impact Statements (PEISs) and conduct scoping meetings, notice of which will be given in the FirstNet" web site (http://www.firstnet.gov). Following completion of the PEISs, proponents of proposed projects will submit site-specific environmental documentation to determine whether a proposed project warrants a Categorical Exclusion, an Environmental Assessment, or an Environmental Impact Statement. The concept of tiering (see National Environmental Policy Act regulations at Title 40, Code of Federal Regulations, part 1508, section 1508.28) will be employed as FirstNet moves from the five PEISs to regional, basin-wide, or site-specific project considerations (Notice, pages 67156-67157).	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.
11/18/2014	Mail	Ellie L. Irons	Commonwealth of VA - Department of Environmental Quality	Scoping / Request for copies of DPEIS and FPEIS	ENVIRONMENTAL REVIEW UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT: PROJECT SCOPING AND AGENCY INVOLVEMENT While this Office does not participate in scoping efforts beyond the advice given herein, other agencies are free to provide scoping comments concerning the preparation of the NEPA document. Accordingly, we are sharing this response to the Notice, and copies of the Notice itself, with selected state and local Virginia agencies whose responsibilities may affect, or be affected by, the plans and/or projects considered in the PEIS covering the eastern states. These agencies are likely to include the following (note: starred (*) agencies administer one or more of the enforceable policies of the Virginia Coastal Zone Management Plan; see "Federal Consistency ..." heading, next): Department of Environmental Quality: -Office of Environmental Impact Review -Northern Regional Office* -Piedmont Regional Office* -Tidewater Regional Office -Valley Regional Office -Blue Ridge Regional Office -Southwest Regional Office -Division of Air Program Coordination* -Division of Land Protection and Revitalization (formerly Waste Division) Office of Stormwater Management* Department of Conservation and Recreation Department of Health (Division of Water Programs*) Department of Game and Inland Fisheries* Virginia Marine Resources Commission* Department of Historic Resources Department of Forestry Department of Transportation Department of Mines, Minerals, and Energy Virginia State Police Department of Emergency Management. In keeping with our regular practice, we will solicit comments from regional planning district commissions and localities when EISs, EAs, or federal consistency documents (again, see next heading) are prepared for programs or projects, based on their nature and geographic impacts. In order to ensure an effective coordinated review of the PEIS, we will require at least 19 copies of it when it is published. This submission may include at least 3 printed copies and 16 CDs, or at least 3 printed copies and an electronic copy available for download at a web site or ftp site. If the PEIS addresses geographic reach or impacts of the program or projects, then it should include one or more U.S. Geological Survey topographic maps as part of its information. We recommend, as well, that project details unfamiliar to people outside FirstNet be adequately described in the PEIS.	Due to the nationwide scope of our current programmatic analysis and the considerable size of the documents, it may not be possible for FirstNet to provide hard copies of the draft and final documents to all interested parties. However, the documents will be available for download on our website to all interested parties.
11/18/2014	Mail	Ellie L. Irons	Commonwealth of VA - Department of Environmental Quality	Coastal Zone Management Act	FEDERAL CONSISTENCY UNDER THE COASTAL ZONE MANAGEMENT ACT Pursuant to the Coastal Zone Management Act of 1972, as amended, and the Federal Consistency Regulations (15 CFR Part 930), federal projects with reasonably foreseeable effects on Virginia's coastal uses or resources must be conducted in a manner which is consistent, to the maximum extent practicable, with the Virginia Coastal Zone Management Program (VCP). The VCP is comprised of a network of programs administered by several agencies. FirstNet must submit a federal consistency determination (FCD) which analyzes the coastal effects of the project in light of the enforceable policies of the VCP (first enclosure), and provides a commitment to comply with the enforceable policies. In addition, we invite FirstNet's attention to the advisory policies of the VCP (second enclosure). Requirements for the contents of FCDs are found in the Federal Consistency Regulations (15 CFR Part 930, Sub-part D, sections 930.39) and also in DEQ's Federal Consistency Information Package (available online at http://www.deq.virginia.gov/Portals/O/DEQ/EnvironmentalImpactReview/FederalConsistencyManual.7.27.1 1. pdf. The Federal Consistency Information Package defines Virginia's coastal zone, among other things. The Federal Consistency Regulations allow up to 60 days for our review of an FCD (15 CFR Part 930, Sub-part C, section 930.41(b)). The FCD may be submitted as a part of and EIS or separately, as you prefer. We recommend that the FCD for a particular project or plan be submitted with the Final EIS rather than the Draft EIS, in order that it reflect resolution of coastal issues that may arise during the comment period for the Draft EIS. In the event broadband network project proponents should seek FirstNet licensing or permitting for their projects, the Federal Consistency Regulations have slightly different requirements and time frames. Three examples of these differences will suffice here: • The federal consistency document is called a "federal consistency certification" rather than a "federal consistency determination." • Projects or plans subject to federal licensing or permitting must be consistent with the enforceable policies of the VCP; the qualifier "to the maximum extent practicable" applies only to direct federal actions. • The time frame for the state's response is 180 days, with a requirement that the state provide a progress report in 90 days and an explanation of the reason for further delay in the response. The Federal Consistency Regulations address federal licensing and permitting in Sub- part D (sections 930.50 through 930.66).	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
11/18/2014	Mail	Ellie L. Irons	Commonwealth of VA - Department of Environmental Quality	Information on existing environment	DATABASE LIST Below is a list of databases that may assist you in the preparation of the NEPA document: • DEQ Online Database: Virginia Environmental Geographic Information Systems Information on Permitted Solid Waste Management Facilities, Impaired Waters, Petroleum Releases, Registered Petroleum Facilities, Permitted Discharge (Virginia Pollution Discharge Elimination System Permits) Facilities, Resource Conservation and Recovery Act (RCRA) Sites, Water Monitoring Stations, National Wetlands Inventory www.deq.virginia.gov/ConnectWithDEQNEGIS.aspx • DEQ Virginia Coastal Geospatial and Educational Mapping System (GEMS) Virginia's coastal resource data and maps; coastal laws and policies; facts on coastal resource values; and direct links to collaborating agencies responsible for current data http://128.172.160.131/gems2/ • DEQ Permit Expert Helps determine if a DEQ permit is necessary www.deq.virgi nia.gov/permitexpert/ • OHR Data Sharing System Survey records in the OHR inventory www.dhr.virginia.gov/archives/datasharingsys.htm • OCR Natural Heritage Search Produces lists of resources that occur in specific counties, watersheds or physiographic regions www.dcr.virgi nia.gov/naturalheritage/dbsearchtool.shtml • DGIF Fish and Wildlife Information Service Information about Virginia's Wildlife resources http://vafwis.org/fwis/ • Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Database: Superfund Information Systems Information on hazardous waste sites, potentially hazardous waste sites and remedial activities across the nation, including sites that are on the National Priorities List (NPL) or being considered for the NPL www.epa.gov/superfund/sites/cursites/index.htm • EPA RCRAInfo Search Information on hazardous waste facilities www.epa.gov/enviro/facts/rcrainfo/search.html • EPA Envirofacts Database EPA Environmental Information, including EPA-Regulated Facilities and Toxics Release Inventory Reports www.epa.gov/enviro/index.html • EPA NEPAssist Database Facilitates the environmental review process and project planning http: //nepaassisttool.epa.gov/nepassist/entry. aspx If you have questions about the environmental review process and/or the federal consistency review process, please feel free to contact me (telephone (804) 698-4325 or e-mail ellie.irons@deq.virgi nia.gov) or John Fisher of this Office (telephone (804)698-4339 or e-mail john.fisher@deq. virginia.gov). I hope this information is helpful to you. Ellie L. Irons, Program Manager Environmental Impact Review	Thank you for your comment.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/2/2014	Mail	Mark Alling	Commonwealth of VA - Department of Environmental Quality	Water Resources	Dear Ms. Pereira: I have reviewed the Scoping for the above referenced project proposed by the National Telecommunications and Information Administration to prepare five regional Programmatic Environmental Impact Statements and conduct scoping meetings. FirstNet intends to build, deploy and operate an interoperable, nationwide public safety broadband network based on a single national network which will allow police, fire emergency medical and other professionals and entities to effectively communicate with each other across agencies and jurisdictions. PRO comments for this project are as follows: Water: Where building and deployment cross or impact surface and groundwater features, erosion and sediment controls should be properly implemented and maintained throughout all phases of construction. E & S controls and Best Management Practices (BMPs) should be inspected/repaired before and after rain events. Please follow all standards and specifications under the Virginia DCR Erosion & Sediment Controls Handbook (1992, 3rd Edition). DEQ recommends maximizing pervious surface areas and green spaces in the construction design to reduce runoff and the environmental impact associated with urban runoff. Please contact Allison Dunaway at (804) 527-5086 for questions dealing with permitting of construction in and near wetlands. Please contact Emilee Adamson at (804) 527-5072 for questions dealing with construction or industrial stormwater permitting.	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.
12/2/2014	Mail	Mark Alling	Commonwealth of VA - Department of Environmental Quality	Waste	Waste: Hazardous or solid waste materials generated should be tested and removed in accordance with the Virginia Hazardous Waste Management Regulations (9 VAC 20-60) and/or the Virginia Solid Waste Management Regulations (9 VAC 20-80). Please understand that it is the generator's responsibility to determine if a solid waste meets the criteria of a hazardous waste and as a result be managed as such. In addition, asbestos waste, lead waste, or contaminated residues generated must be handled and disposed of in accordance with the VSWMR or VHWMR as applicable. DEQ recommends that pollution prevention principles be implemented to reduce the amount of wastes at the source, such as the re-use and recycling of waste materials. If you have any questions concerning hazardous/solid waste management, please contact Jason Miller at (804)527-5028.	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.
12/2/2014	Mail	Mark Alling	Commonwealth of VA - Department of Environmental Quality	Air	Air: DEQ recommends following all air quality standard and specifications to reduce or avoid the emissions of VOCs, especially during periods of high ozone. Fugitive dust should be kept to a minimum, (9 VAC 5-40-5630 et seq). Permits may be required for any boilers or fuel-burning equipment. For further questions, please contact James Kyle at (804) 527-5047. Sincerely, Mark S. Alling Water Monitoring and Planning Manager	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.
12/11/2014	Meeting (New Orleans)	Catherine Cargo	Orleans Parish Communications District (OPCD)	FirstNet outreach	Work on outreach to NENA APCO and their local chapters.	FirstNet will continue to provide information regarding the NEPA process to our stakeholders and provide opportunities for all interested parties to provide input during the release of the draft and final PEISs.
12/11/2014	Mail and Email	Ronald P. Spark, M.D.	Public	Biological Resources	Ms. Pereira: For over a decade I've been one of the hundreds of Tucsonans who dally walk Tucson's Tumamoc Hill. Sited in the midst of Downtown, this volcanic outcropping and Sonoran desert respite affords both the layman and the scientist the engagement and delight in a more than 100 years of reclaimed natural setting. In particular, I'm continually amazed when observing the broadly diverse and robust desert plants and animal species.	Thank you for your comment.
12/11/2014	Mail and Email	Ronald P. Spark, M.D.	Public	Cultural / Historic resources	Its built structures are of a recognized historic character and the trencheras and rock art recall the place as being sacred to the indigenous and extent peoples.	Thank you for your comment.
12/11/2014	Mail and Email	Ronald P. Spark, M.D.	Public	Aesthetics / Recreational Use	As a physician, I am touched by seeing some walkers using canes, braces and, even oxygen, to ascend and absorb the meaningfulness of the Hill. The place has an innate inspiring character. I trust the National Wifi Network will ensure the Public Safety but we must not allow any footprint to lessen the intrinsic public, scientific and cultural value of Tumamoc Hill. Sincerely yours, Ronald P. Spark, M.D. Past-President, Pima County Medical Society Clinical Associate Professor, University of Arizona College of Medicine	Thank you for your comment.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/15/2014	Email	Michael Rosenzweig	University of Arizona	NOI	Dear Ms. Pereira, Please accept the attached pdf file as my comment on the proposed Firstnet system in Pima County, Arizona. BTW I met with four Firstnet people in Tucson at the scoping meeting. They brought professionalism and interest to it. I thought they included their contact information in the material they gave me, but I could not find it when I returned home. The first name of the leader was Genevieve and I would like very much to get in touch and thank her. Sincerely, Mike Michael I. Rosenzweig Director Tumamoc: People & Habitats Professor University of Arizona	Thank you for your comment.
12/15/2014	Email Attachment	Michael Rosenzweig	University of Arizona	Cultural / Historic resources	Because of its location in the heart of Tucson, and its prominent elevation and many straight-line radio access paths to the city, this US National Historic Landmark was selected as one of the sites for a transmission tower in the Pima County system to insure interoperability among first responders. The tower is now working as legs for numerous antennae. But its construction was an historic mistake because it greatly erodes the integrity of the NHL. As it seems likely that FirstNet's new technology will collocate by default on the Tumamoc tower, I believe FirstNet needs to learn about the NHL so that its decisions will be fully informed and not directed to such a default position for lack of background data. I add that the County of Pima & The University of Arizona agreed that as new technology was needed to replace the old on Tumamoc, the new would be deployed elsewhere and the old removed from Tumamoc Hill.	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.
12/15/2014	Email Attachment	Michael Rosenzweig	University of Arizona	Cultural / Historic resources	Ownership The Landmark has four major ownership divisions: • 350 acres of fee simple land; owner, U of A • 200 acres from the original U of A land grant • 300 acres open space; owner, Pima County • 20 acres of former landfill; owner, City of Tucson (capped with an ecologically sound, evapotranspirative layer of soil that makes it available for experiments)	Thank you for your comment.
12/15/2014	Email Attachment	Michael Rosenzweig	University of Arizona	Biological Resources	Ecology Founded as The Carnegie Desert Botanical Laboratory in 1903, it instantly became a leader in ecological research. In 1975, the US Department of the Interior designated part of it and some of its structures a US National Historical Landmark. In 1981, the State of Arizona designated the Hill an "Environmental Research Natural Area." Most of what the world knows about the physiology and ecology of Arizona's iconic saguaro cactus comes from research that began on Tumamoc Hill in 1903 and continues to this very day. In 1985, University and USGS investigators were finally able to establish the nature of the sporadic reproduction of saguaros — it had taken us 80 years! More recently, the Hill hosted the discovery that the isotope ratios of saguaro cactus spines allow us to measure, for the first time, the climate of the Sonoran Desert during the past two centuries. And in 2014, one of its saguaros provided a tissue sample that resulted in the first genome description of any cactus species in the world. Tumamoc Hill is the site of nine plant ecology study quadrats that date from 1906 and are the world's oldest permanent ecology study plots. From 2010-2012, all quadrats were resurveyed with modern optical and digital tools, given GPS coordinates and recensused. All the data of the previous century-plus were digitized, filed with the National Park Service and made publicly available via the Ecological Society of America. Beginning in 1982, long transects were established to record and understand the ecology of more than 100 species of annuals (wildflowers). We now have an unbroken and growing record of 33 generations, capable of detecting subtle variations in environmental conditions such as water regime and weather.	Thank you for your comment.
12/15/2014	Email Attachment	Michael Rosenzweig	University of Arizona	Cultural / Historic resources	Conservation In 1987, the Interior Dept added the remainder of the 680-acre scientific reservation to the landmark in recognition of the Hill's importance to conservation. In 1906, it banished its active stone quarries and excluded domestic grazers and browsers with a 5(+) mile-long fence in order to allow the desert to return to a natural state. Thus was established the world's first restoration ecology project. It is the Hill's conservation status, one of national and international historical significance, whose integrity is severely damaged by the tower.	Thank you for your comment.
12/15/2014	Email Attachment	Michael Rosenzweig	University of Arizona	Cultural / Historic resources	Archaeology For nearly half a century, research on Tumamoc Hill has produced archaeological knowledge about the people who farmed in Tucson starting thousands of years ago. Archaeological remains on the Hill include massive, 2300-yr old trincheras (encircling walls and terraces), more than 150 structures, an array of almost 1000 petroglyphs, and an elaborate prehistoric trail system. The Hill was the site of three successive hilltop settlements with masonry architecture. Very recent work with the isotopes in potsherds shows that, for two millennia or more, Native Americans have been gathering together on the Hill from all around the Tucson basin. In 2010, the US Department of the Interior designated the land and its remains, The Tumamoc Hill Archaeological District of the United States of America. The present communications tower and its associated structures sit on the mesa top where much of the most charismatic ruins are located. Archaeologists must quickly rebury any new excavation to protect it. Any hope of creating an educational experience for visitors is thwarted.	Thank you for your comment.
12/15/2014	Email Attachment	Michael Rosenzweig	University of Arizona	Cultural / Historic resources	Significance to Native American Cultures Tumamoc Hill is a centerpiece of the history of the ancestors of Arizona's O'odham, including the Tohono O'odham Nation, the Ak Chin Indian Community, the Gila River Indian Community, and the Salt River (Pima-Maricopa) Indian Community. The Hill is sacred to all of them. The same is true of the Hopi Nation, and the Pasqua Yaqui, too. Both the University of Arizona and Pima County respect the sensitivity and traditions of native people regarding Tumamoc Hill. The university and the Nations agreed in writing that the footprint of western culture on the Hill would not be increased. When their permission was sought by the county to erect the current tower, they consented only because they were told it was necessary to save lives. Absent that consideration, they would surely prefer to see the tower removed.	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/15/2014	Email Attachment	Michael Rosenzweig	University of Arizona	Aesthetics / Recreational Use	Walking the Hill Each week, thousands of people wend their way along the Tumamoc Hill Road, ascending 800 feet to its mesa top. Without promotion or marketing, "Walking the Hill" has become a Tucson institution woven into the fabric of the community, uniting people from every socio-economic group within our region. The Hill hosts approximately 300,000 to 500,000 walking trips per year. For many, their Tumamoc walk has become a daily ritual. Recently the University of Arizona College of Medicine has begun work on a research project focused on the walkers. It studies the effects of the green desert environment in the midst of an urban heat island on the allostatic load of stress, well-being and spirituality. Meanwhile, despite the crowds, the Hill has no security apparatus or personnel. Instead it relies on the honor and sound judgment of walkers to stay off the mesa top itself. But the need for good security for the FirstNet system would seem to promise tension between the need for reliable interoperability and the demand for liberal public use. Put simply, if FirstNet's needs interfere with easy access to Tumamoc by walkers, the result will be a sustained gnashing of teeth.	Thank you for your comment.
12/15/2014	Email Attachment	Michael Rosenzweig	University of Arizona	Cultural / Historic resources	SUMMARY OF IMPACTS Use of the mesa top of Tumamoc Hill for a communication tower to support interoperability in Pima County will have the following negative impacts. • It will establish, far into the future, a communication superstructure that amounts to a serious cultural, environmental and historical mistake. • It will erode the integrity of a National Historic Landmark. • It will prevent important archaeological resources from being made available to educate the public. • Either it will risk a clash between public use of the Hill for recreation, or else it will occupy an area without security. • It will frustrate the desire of six Native American nations to reduce the presence of unwelcome technical apparatus on a Hill invested with deep religious significance. Michael Rosenzweig 15 December 2014	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/15/2014	Email	Paul Dayton	University of California San Diego	Cultural / Historic resources	Dear Friends, this note relates to the importance of including Tumamoc Hill, in Tucson, Arizona, in FirstNet. I write to support the inclusion of this facility. As you know it has several historic buildings but its most important ongoing legacy is the science.	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/15/2014	Email	Paul Dayton	University of California San Diego	Biological Resources	It very much is the home of the science of desert ecology starting over 100 years ago with Carnegie support. Over the century some of the best desert ecologists in the world spent their careers there developing a unique understanding of the evolution of a desert ecosystem over the last 100 thousand years. In recent time they established unique baseline data on desert plants that span most of the century. They organization is unique and the facility priceless. I hope you can help protect it with FirstNet. Sincerely Paul Dayton	Thank you for your comment.
12/16/2014	Email	Rich Watson	Public	Cultural / Historic resources	I recently heard about the future involvement of First Net on Tumamoc Hill and am encouraged that the Federal Government is concerned about secure communications. However, on a more personal level, I am concerned about maintaining the integrity of this unique and irreplaceable historical and scientific resource. Unique, in part, because it has been guarded, researched and protected by the University of Arizona and many others for over a century. In ancient times, this was home to native people long before Europeans imagined our existence and a strong remnant of those people is still intact on the property. In addition, severe encroachment by recreational users (welcomed with sensitivity), the City of Tucson and high traffic on the perimeter causes substantial risk to this delicate property. Prior to construction of the new towers on Tumamoc, I was personally involved in discussions relating to use, impact and future maintenance. When bonds are passed, funding is available and agreement reached between multiple agencies and jurisdictions it is easy to make well intended promises. Such promises were made prior to the tower development with good intentions. History dictates that memories become short and promises are forgotten over time. In this particular case, it is my sincere hope that you take seriously your new responsibility as a joint caretaker of the history, management and protection of Tumamoc. Once damaged or destroyed, it can never be restored. Consequently, it is imperative that all who are caretakers never lose vigilance as we move into the future. Please respect the ancient people, the century of scientific study and Dr.Michael Rosensweig, who is a highly qualified and deeply invested steward of this property. Rich Watson	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/16/2014	Email	Russell P. Long, CRB, CLHS	Long Realty Company	Cultural / Historic resources	To Whom It May Concern, Tumamoc Hill has been a fixture in our family since the very early 1900's when our great grandfather, Burton Bovee, began working there. Long before we every visited there and as children our mother told us tales of Burton working there, riding his horse and mule all over the Tucson basin collecting samples and specimens. As adults we became aware of the cultural and historical significance of the site as a result of the approximately 3,000 year old Hohokam Indian village atop the hill as well the historic volcanic stone buildings and their current uses. Certainly Tumamoc Hill is a local and national treasure worthy of preservation. Please feel free to contact me if you would like to discuss this or have questions. Thank you. Russell P. Long, CRB, CLHS	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/19/2014	Email	R. Brooks Jeffrey	University of Arizona	Cultural / Historic resources	Ms. Pereira: I'm writing at the request of Dr. Michael Rosenzweig to express my advocacy on behalf of Tumamoc Hill's preservation as a rich cultural landscape. Instead of a long essay defining cultural landscapes (if you don't already know) and recognizing Tumamoc Hill's significance as a multi-layered tell of natural and cultural features, I've attached a presentation I've given many times as a vehicle to educate the various constituencies for whom Tumamoc Hill holds value. I hope this assists to inform any future decisions that may impact Tumamoc Hill. Feel free to contact me directly with any specific questions. Sincerely, Brooks R. Brooks Jeffery	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/20/2014	Mail	Michael Kaiserman	Public	Cultural / Historic resources	Dear Ms. Pereira, I am writing to you to encourage your organization to join forces with many other organizations that are already supporting members for the preservation of the archaeology, cultural history and ecology of Tumamoc Hill. It is my perception that the FirstNet activity would provide a beneficial service to significantly broaden the exposure Tumamoc Hill would have nationally. As I have travelled to Egypt, Greece, Turkey, Israel , Great Britain, Norway, and Mexico were I have visited many of the historical and ancient wonders, not to mention many sites here in the U.S., I believe Tumamoc Hill ranks up there with all these sites in the same historical and ancient context. I trust your organization will come to the same conclusion and move forward with plans to include Tumamoc Hill in the FirstNet activity. Thank you very much for your consideration. Michael Kaiserman Engineering Fellow, Raytheon Missile Systems (Retired)	Thank you for your comment.
12/22/2014	Email	Bruce Hilpert	Public	Cultural / Historic resources	I urge you to protect the cultural resources on the top of Tumamoc Hill in Tucson. This historic/prehistoric site has unique constructions that give insight into the prehistory of the Southwest. Further constructions endangers these resources. I urge you to limit construction on this site to areas that have been previously disturbed and allow no further destruction of these resources. Thank you, Bruce Hilpert	Thank you for your comment.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/22/2014	Email	Charles Broder	Public	Cultural / Historic resources	Allowing first responders to communicate with each other is a very important goal. I sincerely hope that this goal will not be allowed to compromise the important cultural remnants and significance of Tumamoc Hill. It is a treasure which must be preserved.	Thank you for your comment.
12/22/2014	Email	Gayle Harrison Hartman	Public	Cultural / Historic resources	Firstnet, I don't know exactly what you are planning for Tumamoc Hill but you need to know that it is a National Historic Landmark and, as an archaeological site, is listed on the National Register of Historic Places. The hill was used by prehistoric people at least as long ago as 500 B.C. The summit is surrounded by low basalt "walls" (linear rock piles extending for many yards), and the summit itself contains dozens of prehistoric pit structures. There are also over 700 examples of prehistoric rock art on the summit and slopes of the hill. These were recently recorded and published as "Tumamoc Rock Art Revisited: With a Focus on Temporal Affiliation and Management" by Gayle Harrison Hartmann and Peter C. Boyle. The monograph was part of Arizona State Museum Archaeological Series No. 208; the entire publication was entitled New Perspectives on the Rock Art and Prehistoric Settlement Organization of Tumamoc hill, Tucson, Arizona, edited by Gayle Harrison Hartmann and Peter C. Boyle. It is extremely important that no damage be done to the basalt "walls," (trincheras in Spanish), pit house structures, rock art and other manifestations of prehistoric or historic activity on the hill. If you have not already done so, please contact Todd Pitezel at the Arizona State Museum as soon as possible. He is the archaeologist in charge of protecting the hill. pitezel@email.arizona.edu. Thank you, Gayle Harrison Hartmann	Thank you for your comment.
12/22/2014	Email	Georgia Erdmann	Arizona Site Steward	Cultural / Historic resources	Thank you for your consideration when you make decisions regarding placing a tower on Historic Tumamoc Hill. It is a great relief to know that you will use the pads that are already in existence and thus save some endangerment of this ancient site. It is such a great opportunity to work together to honor the ancient archaeology of the area. Thank you again. Respectfully, Georgia Erdmann	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/22/2014	Email	Jane Levin	Public	Cultural / Historic resources	I am a volunteer archeological site steward in Pima County. I am writing to encourage you to restrict any construction on the antenna pads on Tumamoc Hill. The trincheras there are ancient and precious and need to be protected. Thank you for your consideration. Sincerely, Jane Levin	Thank you for your comment.
12/22/2014	Email	Jaye S. Smith	Public	Cultural / Historic resources	Dear Ms. Pereira; As a Pima County resident and an avid archaeological enthusiast, I am extremely concerned about the proposed impact to the most important site, both historically and archaeologically, in Pima County - Tumamoc Hill. This site is extremely important for ongoing research about Hohokam Cultures, as well as immense local historical value to many of Pima County's first pioneer families, the University of Arizona, the UA School of Anthropology and the Arizona State Museum. Please help protect Tumamoc Hill by limiting the proposed construction to the existing antenna pads. I fully realize the importance of providing advanced communications for our first responders, but it is also important to protect the ancient trincheras sites and petroglyphs such as those found on Tumamoc Hill that we can never replace or restore once impacted. So many important archaeological sites in Pima County have been lost in recent years; we just can not afford to lose a treasure as important as Tumamoc Hill. As a proud member the Arizona State Museum, the Arizona Archaeological and Historical Society and Archaeology Southwest, I am committed to offer whatever help or assistance is needed to develop a plan that will provide the necessary communications structure and preserve this irreplaceable Hohokam site. Thank you for your attention; Sincerely; Jaye S. Smith	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/22/2014	Email	Judith Reisman	Site Steward	Cultural / Historic resources	As an archeological site steward, I help protect a very old Hohokam site from theft and vandalism. I am in complete support of creating a first responders wifi network, but respectfully ask that any new hardware installations on Tumamoc Hill be confined to existing hardware sites so that the rest of this precious archeological site remains. It is wonderful to think of using the internet to help our first responders in disasters and emergencies. It is also wonderful that you'all are so ready to be partners in preserving the rest of the aspects of this site. Thank you, Judith Reisman, site steward	Thank you for your comment.
12/22/2014	Email	Kaitlin Meadows & Albert Lannon	Wild Heart Ranch	Cultural / Historic resources	Please limit FirstNet construction on Tucson's Tumamoc Hill to existing antenna sites so that new footprints are not created. Any new work away from already-disturbed areas will impact negatively on ancient archeological sites, sites that contain habitation and farming areas, rock art with an amazing number of solstice and equinox markers, and artifacts that continue to help archaeologists understand the ancient history of this important area. Several years ago we helped document some of those solstice markers. To stand on the top of Tumamoc Hill as the sun rose in the east and the full moon set in the west on the Winter Solstice and see the sudden light -- "sun daggers"-- on petroglyphs mark the changing of the season was a magical and humbling experience. It speaks to the knowledge, skill, and ability of those ancient people as something well worth preserving. Thank you, Kaitlin Meadows & Albert Lannon	Thank you for your comment.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/22/2014	Email	Katherine Cerino	Arizona Archaeological and Historical Society	Cultural / Historic resources	First, I am pleased with the Firstnet efforts - this seems like a very sensible idea. The purpose of this note is to bring to your attention the importance archaeologically of Tumamoc Hill in Tucson. The Hill has already been impacted by many towers some of which are no longer in use. I would like to ensure that the development you carry out on the Hill uses the existing disturbed footprint rather than adding to it. The Hill is archaeologically unique in the Tucson Basin in that it has some of the earliest habitation sites dating to 500 BC and some of the earliest pottery in the Basin. It was later used by the Hohokam people who pecked rock art over a great deal of the hill concentrating on the top where developmental impact is greatest. In addition, there are unique prehistoric walls around the hill. It was clearly an important and sacred place in the past and if you go up there today and simply look at the spectacular 380 degree view without even considering the importance of the past it is obviously a special place. Thank you, Katherine Cerino	Thank you for your comment.
12/22/2014	Email	Lance Trask	Public	Cultural / Historic resources	Dear Sir or Madam; I applaud the government for coming up with plans to have Wi-Fi available to first responders and an agency to oversee those plans. Communication at the beginning of an event is critical and can make the difference between life and death. It is likely that antennae(s) or repeaters will be considered at a location called Tumamoc Hill. It is ideal because it has a 360 degree view of a considerable portion of Southern Arizona. It is also on the National Register and holds valuable cultural resources. Some disturbances have already occurred on Tumamoc Hill and I urge you to consider placing any equipment in areas already impacted. Access to the top of the hill is via existing roads and these roads should be adequate for transporting and installing the equipment for the proposed Wi-Fi system. Currently the top of the hill is off limits and behind locked gates, so any installed equipment will be fairly well protected. I also urge you to work closely with the archaeological community within the Tucson area as they can provide expertise and work with the agency so it's needs are met and the cultural resources are preserved for the future. Thank you very much, Lance K. Trask	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/22/2014	Email	Linda Stelljes	Public	Cultural / Historic resources	As a historically and archaeologically sensitive area, I am asking that FirstNet help protect the ancient trincheras on Tumamoc Hill by restricting construction to the existing antenna pads, so our first responders can communicate while still allowing Pima County and the University of Arizona to protect this important place of the past. I am a member of Arizona State Parks Site Stewards, and we are all volunteers who devote our time and energy to preserving, monitoring and protecting historical Hohokam and other paleo-Indian sites in Arizona. Human history in the Southwest (and everywhere) is essential to understanding our ancestors and we should all be stewards of the sites that reveal clues to human civilization and how people lived in the past. What may not look important to the untrained eye can hold great significance to our understanding. Thank you for your attention on this matter. We can all work together to preserve and protect our history. Sincerely, Linda Stelljes	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/22/2014	Email	Peggy Wenrick	Arizona Site Steward	Cultural / Historic resources	I understand how important the project proposed for installation on Tumamoc Hill in Tucson, Arizona is for promoting quick response in emergencies. However, I want to stress the need for careful planning and execution of the project. I am an Arizona Site Steward who regularly monitors the condition of the archeological district elements on Tumamoc. Even after many visits, I am still awed to realize that early peoples created structures and lived in this special space. I request that every effort be made to minimize the footprint of the upcoming work and strongly urge the structure(s) be confined to the antennae pads already existing. Thank you for the opportunity to comment. Peggy Wenrick	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/22/2014	Email	Peter J. Baum	Public	Cultural / Historic resources	Hello Ms Pereira; Please accept my fervent plea that any Firstnet access to, and construction on, Tumamoc Hill be done with the utmost sensitivity to the petroglyphs and ruins of Tucson's first public architecture, going back over two thousand years! I've called Tucson home for fifty 50 years and worked downtown for the last 38. I've had the privilege of spending time atop the hill with extraordinary experts Paul and Suzi Fish, as well as fascinating petroglyph experts. I've sadly watched Tumamoc being "loved too much" by looters, and "loved too little" by Pima County's and the University of Arizona's budgetary stinginess. Too much irreversible damage has been done already. Please encourage Firstnet to be extraordinarly sensitive to the unique culture treasures still left on Tumamoc, minimize work to existing pads and overall trod with the lightest footprint possible. Thank you Peter J. Baum	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/22/2014	Email	Robert Wenrick	Arizona Site Steward	Cultural / Historic resources	I understand how important the project proposed for installation on Tumamoc Hill in Tucson, Arizona is for promoting quick response in emergencies. However, I want to stress the need for careful planning and execution of the project. I am an Arizona Site Steward who regularly monitors the condition of the archeological district elements on Tumamoc. Even after many visits, I am still awed to realize that early peoples created structures and lived in this special space. I request that every effort be made to minimize the footprint of the upcoming work and strongly urge the structure(s) be confined to the antennae pads already existing. Thank you for the opportunity to comment. Robert Wenrick	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/23/2014	Email	Denise Waldo	Pima County Procurement	Cultural / Historic resources	Please help protect the ancient trincheras on Tumamoc Hill by restricting construction to the existing antenna pads, so our first responders can communicate while still allowing Pima County and the University of Arizona to protect this important place of the past. My husband & I have been involved in a volunteer program to help protect archaeology sites for years. We are lucky in Arizona to have many wonderful & important sites, Tomamoc Hill being one of them. We respectfully ask that you consider the adverse impact your project could have on this site & do all you can to help protect it. Thank you. Denise Waldo, CPPB	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/23/2014	Email	Fran Maiuri	Public	Cultural / Historic resources	Dear Ms. Amanda Pereira: I am a resident of Tucson, Arizona and I am writing to ask you to minimize the impact on Tumamoc Hill in Tucson, AZ during the construction of the FirstNet communication system. This is an extremely rich Archaeological site, one of the most important in the Tucson area. There is much on the mountain that could still inform us about our early ancestors and those features and artifact should not be disturbed. I understand the value of the FirstNet communication being put in place and support the project as long as the land where current antenna pads exist is used for the work. Please do not disturb any of the rest of this site, the archaeological site and any of the natural features and environment. Let's do this work so that the area where our prehistoric ancestors lived, worked, worshipped and recreated is untouched	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/23/2014	Email	Fran Maiuri	Public	Biological Resources	and where native plants, animals, insects and birds continue to enjoy this natural area within Tucson. What is disturbed cannot be brought back again and will no longer be available as natural habitat and for future research and better understanding of the past. Thank you. Sincerely, Fran Maiuri	
12/23/2014	Email	John A. Armstrong	Public	Cultural / Historic resources	Please help preserve areas of archaeological interest on Tumamoc Hill in Tucson, Arizona by limiting construction to existing antenna pads.	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/23/2014	Email	Keith Bagwell	District Five Pima County Supervisor	NOI	Ms. Amanda Pereira, Please see the attached letter, submitted on behalf of District Five Pima County Supervisor Richard Elías as comments on activities FirstNet is considering with regard to Tumamoc Hill in Tucson, Arizona. The original letter will be sent to you via postal mail. Yours truly, Keith Bagwell	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/23/2014	Email	M. Nichols	Public	Cultural / Historic resources	Tumamoc Hill is a critical site of an ancient inhabited area, 10,000 plus years ago, in North America. There is only one other site similar to this one, in Sonora, Mexico. It is imperative that old pads be used for the towers, protecting the areas that have not been disturbed. This site is not only a treasure for the residents of Tucson and the University of Arizona, it is a treasure on the North American Continent. Your help in protecting this site is invaluable and will become an excellent public relations tool as your company expands. Thank you for becoming partners in protecting such a unique and ancient example of early civilization in the Americas. M. Nichols	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/23/2014	Mail	Richard Elias	Pima County Board of Supervisors	Cultural / Historic resources	Dear Ms. Pereira, It has come to my attention that FirstNet activities might have an impact on Tumamoc Hill,an iconic landmark that towers over the west side of the Tucson metropolitan area, in the Pima County District that I am elected to represent. Tumamoc Hill is a very special place. As a result the Pima County Board of Supervisors, upon which Iserve,bought 320 acres of land on and around the hill in 2009 to protect it from development and unsuitable uses. There are now 860 acres of land on and around the hill protected in perpetuity. This hill was inhabited by Native Americans for thousands of years, ancestors of today's Tohono O'Odham Nation members, and carries an O'Odham name, Tumamoc, which is their word for horned lizard. Remains of their residency and farming on the hill are visible and subject of substantial study.	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/23/2014	Mail	Richard Elias	Pima County Board of Supervisors	Biological Resources	The Carnegie Foundation established a Desert Botanical Laboratory on Tumamoc Hill in 1903 to study scientifically the unique flora of the Sonoran Desert, and the buildings associated with it are together a National Historic Landmark. A University of Arizona operation since 1960,the laboratory has studied desert flora continuously for longer than any other facility in the world. Its records are priceless.	Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/23/2014	Mail	Richard Elias	Pima County Board of Supervisors	Aesthetics / Recreational Use	Tumamoc' s unique shape and urban presence set it off as a unique and special sight for area residents and their visitors. The narrow, winding road up it leading to the laboratory has become a very popular exercise path for thousands of local residents. Tumamoc Hill is a special iconic feature that deserves protection and its many fragile features require careful treatment. Sincerely Richard Elias District Five Pima County Supervisor	Thank you for your comment.
12/23/2014	Email	Sherry Massie	Public	Cultural / Historic resources	Dear Ms. Pereira, I understand that FirstNet is a federal program which will allow first responders all over the U.S. to communicate with each other, as needed, by deploying a new national Wi-Fi network using a reserved public safety broadband range. I think this is a wonderful goal for our nation, but I realize this may also impact a very important historical/archaeological site - the ancient trincheras on Tumamoc Hill in Tucson, AZ. Would you please consider restricting construction to the existing antenna pads so that as little impact as possible occurs to this historic area? Although I have lived in Tucson for 13 years, I only recently visited this site through the auspices of the Arizona Archaeological and Historical Society. I had no idea that there were trincheras there dated to 300 B.C., and that there was evidence of Hohokam settlement dating to 800 A.D. I saw some amazing rock art, as well as evidence of solar markers and alignments. It's an impressive site so close to a major urban area, and one that needs to be preserved for everyone to be able to have to same opportunity as I had to learn and enjoy part of our southwestern legacy. I hope you will be able to complete your Wi-Fi goal as well as helping preserve this important landmark. Thank you for your consideration. Sincerely yours, Sherry Massie	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/24/2014	Email	Aaron D. Flesch, Ph.D.	University of Arizona	Cultural / Historic resources	Dear Ms. Amanda Pereira: It has come my attention that the activities of Firstnet may eventually affect the ecological, social, and cultural values of Tumamoc Hill. Thus, I wanted to write to you to express the value of Tumamoc so that this information can be applied when evaluating the potential impacts of any proposed Firstnet activities on or around Tumamoc. Tumamoc Hill is a National Historic Landmark, a U.S. Archaeological District, and its value to the local, regional, national, and global communities are immense.	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/24/2014	Email	Aaron D. Flesch, Ph.D.	University of Arizona	Biological Resources	As an ecologist that works on the Hill, and as a member of the Tucson community that walks the Hill and helps interpret its natural history and ecology to the public, I can speak specifically about Tumamoc's ecological and social values. In the first decade of the 1900s, some of our nation's first ecologists were tasked with locating a site to study desert plants and placing what would become the US' first ecological research station. At that time when the landscape was largely undeveloped and options for placing the stations nearly unlimited, they considered sites in Arizona, New Mexico, California, and the neighboring Mexican states of Sonora and Chihuahua. In the end, they chose Tumamoc for the site because of its remarkable diversity, exceptional natural qualities, and the fact that the Hill and surroundings included a large number of plant communities for study. Those facts speak to the uniqueness and incredible value of the Hill and the natural vegetation that still covers it. For the next 100 years scientists working on the Hill have made immeasurable contributions to our understanding of how the natural world is structured and how it functions, and those activities continue to this day under the leadership of Director Rosenzweig.	Thank you for your comment.
12/24/2014	Email	Aaron D. Flesch, Ph.D.	University of Arizona	Aesthetics / Recreational Use	As the surroundings around the Hill have changed over the last 100 years, the values of Tumamoc have grown. Tumamoc sees tens or perhaps hundreds of thousands of visitors each year of all ages and backgrounds. Many of those visitors live in a suburban or urban environment where they have little opportunity to experience the Sonoran Desert in its natural state and to connect with nature on deeper spiritual and aesthetic levels. Those qualities and experiences are offered by Tumamoc because of its close proximity to those populations and the accessibility the University of Arizona and the station's Director have provided. Please consider the remarkable and multifaceted values of Tumamoc Hill and the Desert Laboratory in your plans and proposals related to the Firstnet project. Feel free to contact me at the address below if I can be of help. My regards Aaron D. Flesch, Ph.D.	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/24/2014	Email	Brian Metcalf	Public	Cultural / Historic resources	Ms. Amanda: I am contacting you regarding the planned update of the communications infrastructure on Tumamoc Hill for first responders. Tumamoc is almost in the heart of Tucson. It is been a protected area of biological research for over a century. contains invaluable archaeological artifacts that ere well over 2000 years old. I ask you to please protect those irreplaceable resources for future generations. Please restrict your construction activities to existing antenna pads. Thank you. Brian Metcalf	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/24/2014	Mail	Courtney Rose, PhD.	Pima County Sustainability and Conservation	Cultural / Historic resources	Dear Ms. Pereira: This letter is a response to the request for comments on the proposed undertaking published in the Notice in the Federal Register (Vol. 79, No. 218). Tumamoc Hill has several important federal and state designations. Comprised of some 870 acres, it is an Archaeological District listed in the National Register of Historic Places and the Desert Laboratory was designated a National Historic Landmark in 1965. In 1976, the Desert Laboratory and Tumamoc Hill were together designated a National Environmental Study Area by the Department of Interior; and designated by the State of Arizona as a State Scientific and Educational Natural Area in 1981. Tumamoc Hill is also considered a traditional cultural property and ancestral site to local Tribes. Tumamoc Hill's peak rises to an elevation of 3,108 ft (947 m) above sea level. Located just west of downtown Tucson in T14S, R13E, Sections 9, 10, 16, and 15, the preservation of its cultural and scientific significance is of great importance to the local community and at a national level. Land ownership includes the University of Arizona on behalf of the Board of Regents, Pima County, Arizona State Land Department, and the City of Tucson. Archaeol ogical surveys of Tumamoc Hill began in the 1970s followed by subsequent limited archaeological excavations. Known as Cemamagi Do'ag in O'odham,Tumamoc Hill, archaeological site designated AZ AA:16 :6(ASM)], is known to have multiple prehistoric occupations that left behind remnants of large rock walls (trincheras) , petroglyphs, agricultural fields, pithouses, and O'odham cemeteries. A recent undertaking on Tumamoc Hill included the consolidation of wireless facilities and replacing several towers with a single communications tower (by the Pima County Wireless Integrative Network (PCWIN) project implemented in 2014). As the construction included consolidation and the dismantling unused buildings, the overall footprint was reduced . State, Federal, and Tribal consultation resulted in a determination of Adverse Effect to the Area of Potential Effect for Direct Effects and for Visual Effects to the Tumamoc Hill Archaeologi cal District. The undertaking licensed by the Federal Communications Commission (FCC) required an Environmental Assessment to fulfill requirements under the National Environmental Policy Act (NEPA) and a Memorandum of Agreement was executed to fulfill Section 106 of the National Historic Preservation Act (NHPA). Mitigation strategies included archaeological data recovery and cultural sensitivity education program in accordance with the Arizona State Historic Preservation Office and the Advisory Council on Historic Preservation .The Univers ity of Arizona Tumamoc Hill Cultural Resources Policy and Management Plan (2008) specifies tribal interests in restoring Tumamoc Hill to its former natural condition.	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/24/2014	Mail	Courtney Rose, PhD.	Pima County Sustainability and Conservation	Cultural / Historic resources	In summary, Tumamoc Hill official designations include: -The Desert Laboratory (comprising 870 acres on Tumamoc Hill) was designated a National Historic Landmark in 1965, and in 1966 was listed in the National Register of Historic Places (National Register No.66000190).Active biological studies are ongoing on a portion of the hill, which was designated as a National Environmental Study area in 1976 by the U.S. Department of the Interior and designated as an Arizona State Scientific and Educational Natural Area in 1981 by the Arizona State Parks Board. -The same 870 acres comprises the Tumamoc Hill Archaeological District, which was listed in the National Register of Historic Places in 2010. -The Tohono O'odham Nation, the Hopi Tribe, the Pascua Yaqui Tribe, the Gila River Indian Community, the Ak-Chin Indian Community, and the Salt River Pima-Maricopa Indian Community consider Tumamoc Hill an ancestral site of cultural significance. -Should FirstNet propose to include Tumamoc Hill in its network planning, it is critical that the cultural, natural, and scientific significance of this site be considered and impacts to the site be avoided. Sincerily, Courtney Rose, Ph.D., Program Coordinator Pima County Office of Sustainability & Conservation Cultural Resources and Historic Preservation Division	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/24/2014	Email	Courtney Rose, PhD.	Pima County Public Works Center, Office of Sustainability and Conservation	NOI	Good afternoon: Please see attached document with comments regarding Tumamoc Hill, located in Tucson, Arizona. The letter is a response to a request for comments by the First Responder Network Authority NOI to Prepare Programmatic Environmental Impact Statements and Conduct Scoping for the Nationwide Public Safety Broadband Network [Federal Register/Vol 79/No. 218]. Thank you for your consideration. Courtney Rose	Thank you for your comment.
12/26/2014	Email	Steve Long	Long Realty Company	Cultural / Historic resources	Thank you Russell! Let me know how I can help. Steve On Tue, Dec 16, 2014 at 6:36 AM, Long, Russell <longs@longrealty.com> wrote: To Whom It May Concern, Tumamoc Hill has been a fixture in our family since the very early 1900's when our great grandfather, Burton Bovee, began working there. Long before we every visited there and as children our mother told us tales of Burton working there, riding his horse and mule all over the Tucson basin collecting samples and specimens. As adults we became aware of the cultural and historical significance of the site as a result of the approximately 3,000 year old Hohokam Indian village atop the hill as well the historic volcanic stone buildings and their current uses. Certainly Tumamoc Hill is a local and national treasure worthy of preservation. Please feel free to contact me if you would like to discuss this or have questions. Thank you. Russell P. Long, CRB, CLHS	Thank you for your comment.
12/27/2014	Email	Quincy M. Kennedy	Public	Cultural / Historic resources	Thank you for offering to read our comments on the proposed communications towers on Tumamoc Hill. I study archaeology and am intimately aware of the hill's value as a cultural resource. Communication for first responders is very important, but please be careful with the cultural resources up there.	Thank you for your comment.
12/28/2014	Email	Doug Little	Public	Cultural / Historic resources	Please protect the ancient *trincheras* on Tumamoc Hill by restricting construction to the existing antenna pads, so our first responders can communicate while still allowing Pima County and the University of Arizona to protect this important place of the past.	Thank you for your comment.
12/28/2014	Email	Larry Venable	University of Arizona	Cultural / Historic resources	I am writing to explain to you the high cultural, historic and ecological value of Tumamoc, a research station of the University of Arizona in Tucson. This property is sacred to 5 southwestern native American tribes, with human constructions dating back at least 2,000 years.	Thank you for your comment.
12/28/2014	Email	Larry Venable	University of Arizona	Biological Resources	Since 1903 it has been an ecological research station, first of the Carnegie Institute of Washington, now of the University of Arizona. Important work in the history of ecology was and is conducted here. Some ongoing long-term ecological projects have been running for over 100 years and the data has been recently archived at Ecological Archives, Ecological Society of America. There are over 20 ongoing ecological projects, some funded by the National Science Foundation. I invite you to please join us in preserving and enhancing this wonderful long-standing resource. Larry Venable	Thank you for your comment.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/28/2014	Email	Marilyn Guida	Public	Cultural / Historic resources	Dear Ms Amanda Pereira, I write to urge that the FirstNet need for access to Tumamoc Hill in Tucson, Arizona will contribute to preservation of the cultural, archaeological and biological resources of the area by making use of the existing pads for the antennas, transmitters, and other equipment needed by FirstNet. This is an area of cultural significance to the Tohono O'odham Tribe from the 15th Century to modern times. It also contains evidence of occupation from the Early Agricultural Period of the indigenous people as far back as 2,000 years ago as well as the Hohokam people circa A.D. 800 (1100 years ago). This length of human occupation is highly significant and an important reason why modern construction in this area should not be expanded. The University of Arizona currently manages many currently active research projects into the cultural and biological resources of this area. This is an additional reason why expansion of present areas impacted construction should not be allowed. Perhaps most important of all is the impact to the Tohono O'odham people who have used this area for at least five centuries and continue to use it today. As the first Americans, we should respect their longstanding rights to use of Tumamoc Hill as our first priority. Thank you for considering this plea, Marilyn Guida	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/28/2014	Email	Michael Rosenzweig	University of Arizona	Cultural / Historic resources	Dear Ms Pereira, I have more to add to the FirstNet scoping process. As I promised, I have tracked down and am sending a number of documents relating to Tumamoc Hill. Eight pdf files are attached. (There could have been more if there had been more time.) The files include: ** three from county documents of November 2007. One of these contains comments of US Rep Raúl M. Grijalva, as well as the strong point made by Dr. Ned Norris Jr. (Chairman of the Tohono O'odham Nation), i.e., that Tumamoc has spiritual significance to the Nation and other tribes. (By the way, Pima County, in early 2009, did buy the land mentioned in the discussions. I have a video of the auction.) ** three from The University of Arizona management plan for Tumamoc. These cover the 2007 plan of the City of Tucson, acknowledgment of the importance of the Hill to native tribes, and restrictions on lessees to prevent further degradation of the Hill. ** an excerpt from an Island Press book about restoration ecology, acknowledging that Tumamoc Hill originated this crucial part of environmental conservation. ** an excerpt from a recent newsletter of the University's Dept of Ecology & Evolutionary Biology. Thank you again for the care you have taken to learn about our area in preparation for FirstNet planning. Sincerely, Michael Rosenzweig Director, Tumamoc: People & Habitats University of Arizona Tucson	Thank you for your comment.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	NOI	Dear Ms. Pereira : The U.S. Environmental Protection Agency has reviewed the November 12, 2014 Notice of Intent to prepare Programmatic Environmental Impact Statements and Conduct Scoping for the Nationwide Public Safety Broadband Network. Our comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508) and § 309 of the Clean Air Act. To assist in the scoping process for this project , we have identified several issues for your attention in the preparation of the Western regional EIS. We are most concerned about the following issues: impacts to water and air, impacts to biological resources, invasive species management , and habitat protection. We appreciate the opportunity to review this NOI and are available to discuss our comments. Please send one hard copy of the Draft PEIS and one CD ROM copy to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please contact me at (415) 972-3545, or contact Scott Sysum, the lead reviewer for this project. Scott can be reached at (415) 972- 3742 or sysum.scott @epa.gov.	Thank you for your comment.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Purpose and Need	US EPA DETAILED COMMENTS ON THE NOTICE OF INTENT TO PREPARE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENTS AND CONDUCT SCOPING FOR THE NATIONWIDE PUBLIC SAFETY BROADBAND NETWORK, DECEMBER 29, 2014 Statement of Purpose and Need The Draft Programmatic Environmental Impact Statement should clearly identify the underlying purpose and need to which the First Responder Network Authority is responding in proposing the alternatives (40 CFR 1502.13). The purpose of the proposed action is typically the specific objectives of the activity, while the need for the proposed action may be to eliminate a broader underlying problem or take advantage of an opportunity. Recommendation: The purpose and need should be a clear, objective statement of the rationale for the proposed project.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Alternatives	Alternatives Analysis The National Environmental Policy Act requires evaluation of reasonable alternatives, including those that may not be within the jurisdiction of the lead agency (40 CFR Section 1502.14(c)). A robust range of alternatives will include options for avoiding significant environmental impacts. The DPEIS should provide a clear discussion of the reasons for the elimination of alternatives which are not evaluated in detail. Alternative network routes, including buried or aerial options, as well as environmentally preferable routes, should be evaluated. The DPEIS should also evaluate alternative configurations for access roads. The alternatives analysis should describe the approach used to identify the alternative routes and the criteria used to select the different routes. The environmental impacts of the proposed action and alternatives should be presented in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14). The potential environmental impacts of each alternative should be quantified to the greatest extent possible (e.g., acres of forest impacted, tons per year of emissions produced). Recommendations: The DPEIS should describe how each alternative was developed, how it addresses each project objective, and how it will be implemented. The DPEIS should describe the methodology and criteria used for determining the network route and alternative routes. The alternatives analysis should include a discussion of environmentally preferable options for the network, including the use of underground cables versus overhead wires; alternative configurations for access roads; and alternative methods of construction, such as using heavy lift helicopters to transport and set cell towers. The DPEIS should clearly describe the rationale used to determine whether impacts of an alternative are significant or not. Thresholds of significance should be determined by considering the context and intensity of an action and its effects (40 CFR 1508.27).	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Water Resources	Water Resources Geographic Extent of Waters of the United States The project applicant should coordinate with the U.S. Army Corps of Engineers to determine if the proposed project requires a Section 404 permit under the Clean Water Act. Section 404 regulates the discharge of dredged or fill material into waters of the United States (WUS), including wetlands and other special aquatic sites. The DPEIS should describe all WUS that could be affected by the project alternatives, and include maps that clearly identify all waters within the project area. A jurisdictional delineation will confirm the presence or absence of WUS in the project area and help determine whether or not the proposed project would require a Section 404 permit. Recommendation: The DPEIS should discuss the potential that WUS could be affected and that consultation with the USACE may be required to determine if there are jurisdictional WUS present at individual project sites. Drainages, Ephemeral Washes, and Floodplains Natural washes perform a diversity of hydrologic, biochemical, and geochemical functions that directly affect the integrity and functional condition of higher-order waters downstream. Healthy ephemeral waters with characteristic plant communities control rates of sediment deposition and dissipate the energy associated with flood flows. Ephemeral washes also provide habitat for breeding, shelter, foraging, and movement of wildlife. Many plant populations are dependent on these aquatic ecosystems and adapted to their unique conditions. The potential damage that could result from disturbance of flat-bottomed washes includes alterations to the hydrological functions that natural channels provide in arid ecosystems, such as adequate capacity for flood control, energy dissipation, and sediment movement; as well as impacts to valuable habitat for desert species. Recommendations: The DPEIS should discuss the potential that individual projects may impact aquatic features that are determined not to constitute WUS, and discuss potential mitigation. The DPEIS should address the potential effects of project discharges, if any, on surface water quality.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Biological Resources	Biological Resources, Habitat and Wildlife The DPEIS should identify all petitioned and listed threatened and endangered species and critical habitat that might occur within individual project areas. The document should identify and quantify which species or critical habitat might be directly, indirectly, or cumulatively affected by each alternative and mitigate impacts to these species. Emphasis should be placed on the protection and recovery of species due to their status or potential status under the federal or state Endangered Species Act. Network line rights of way are anthropogenic disturbances which alter the spatial structure of habitat elements, creating linear patches or line corridors which in tum impact ecological integrity by modifying ecological processes (abiotic & biotic) at various scales. Network line ROWs can result in habitat fragmentation and increased habitat edge effects, affecting individual species with different intensity. Recommendations: The DPEIS should discuss how the proposed action would comply with ESA requirements, including any necessary ESA Section 7 consultation efforts with the U.S. Fish and Wildlife Service. EPA recommends that FirstNet coordinate with USFWS field offices and with applicable state biological resource management agencies to ensure that current and consistent surveying, monitoring, and reporting protocols will be applied in protection and mitigation efforts. The DPEIS should describe the potential for habitat fragmentation and obstructions for wildlife movement from the construction of individual projects and other projects in the area. Discuss the need for monitoring, mitigation, and if applicable, translocation management plans for the sensitive biological resources. This could include, but is not limited to, a Bird and Bat Conservation Strategy, a Raven Monitoring, Management, and Control Plan, and Special - Status Plant Impact Avoidance and Mitigation Plan. The DPEIS should include assurances that the design of the aerial lines would be in compliance with current standards and practices that reduce the potential for raptor fatalities and injuries.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.

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12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Biological Resources	The EPA is also concerned about the potential impacts of construction, installation, and maintenance activities (grading, filling) on habitat. We encourage the use of alternatives that avoid and protect high value habitat and create or preserve linkages between habitat areas. We are also concerned with management of the ROW, specifically vegetation control, in order to prevent natural forest succession. ROW management is usually practiced to protect the system from windfall, contact with trees and branches, and other potential hazards. Additionally access roads are maintained in order to ensure access for maintenance and upkeep of the system components. Recommendations: , The DPEIS should describe potential impacts from construction, installation, and maintenance activities on habitat and threatened and endangered species. The DPEIS should describe the ROW vegetation management techniques to be used and potential associated environmental impacts, especially if mechanical methods or herbicides are to be used. The DPEIS should indicate the location of important wildlife habitat areas. The DPEIS should describe what measures will be taken to protect important wildlife habitat areas and to preserve linkages between them.	
					Invasive Species Human actions are the primary means of invasive species introductions. The construction of network lines may cause disturbance of ROW soils and vegetation through the movement of people and vehicles along the ROW, access roads, and laydown areas. These activities can contribute to the spread of invasive species. Parts of plants, seeds, and root stocks can contaminate construction equipment and essentially "seed" invasive species wherever the vehicle travels. Invasive species infestations can also occur during periodic buried/aerial line ROW maintenance activities especially if these activities include mowing and clearing of vegetation. Once introduced, invasive species will likely spread and impact adjacent properties with the appropriate habitat. Executive Order 13112, Invasive Species (February 3, 1999), mandates that federal agencies take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. Executive Order 13112 also calls for the restoration of native plants and tree species. If the proposed project will entail new landscaping, the DPEIS should describe how the project will meet the requirements of Executive Order 13112. In addition, we encourage alternative management practices that limit herbicide use, focusing instead on other methods to limit invasive species vegetation and decrease fire risk. Recommendations: The DPEIS should describe the invasive plant management plan used to monitor and control noxious weeds. If herbicides or pesticides will be used to manage vegetation, the DPEIS should disclose the projected quantities and types of chemicals. The invasive plant management plan should identify methods that can be used to limit the introduction and spread of invasive species during and post-construction. These measures can include marking and avoidance of invasive species, timing construction activities during periods that would minimize their spread, proper cleaning of equipment, and proper disposal of woody material removed from the ROW. Because construction measures may not be completely effective in controlling the introduction and spread of invasives, the DPEIS should describe post-construction activities that will be required such as surveying for invasive species following restoration of the construction site and measures that will be taken if infestations are found.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Air Quality	Air Quality The DPEIS should provide a discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards, criteria pollutant nonattainment areas, and potential air quality impacts. The DPEIS should describe and estimate air emissions from potential construction and maintenance activities, as well as proposed mitigation measures to minimize those emissions. The EPA recommends an evaluation of the following measures to reduce emissions of criteria air pollutants and hazardous air pollutants (air toxics). Recommendations: • Existing Conditions - The DPEIS should provide a detailed discussion of ambient air conditions, NAAQS, and criteria pollutant nonattainment areas in the vicinity of the project. • Quantify Emissions - The DPEIS should estimate emissions of criteria pollutants and green house gasses from the proposed individual projects and discuss the timeframe for release of these emissions over the lifespan of the projects. The DPEIS should describe and estimate emissions from potential construction activities, as well as proposed mitigation measures to minimize these emissions. • Specify Emission Sources - The DPEIS should specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance. This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention. • Construction Emissions Mitigation Plan -The DPEIS should include a draft Construction Emissions Mitigation Plan and ultimately adopt this plan in the Record of Decision. In addition to all applicable local, state, or federal requirements, we recommend the following control measures (Fugitive Dust, Mobile and Stationary Source and Administrative) be included in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of particulate matter and other toxics from construction-related activities:	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.

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					o Fugitive Dust Source Controls: The DPEIS should identify the need for a Fugitive Dust Control Plan to reduce Particulate Matter 10 and Fine Particulate Matter 2.5 emissions during construction and operations. We recommend that the plan include these general commitments: • Stabilize heavily used unpaved construction roads with a non-toxic soil stabilizer or soil weighting agent that will not result in loss of vegetation, or increase other environmental impacts. • During grading, use water, as necessary, on disturbed areas in construction sites to control visible plumes. • Vehicle Speed • Limit speeds to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions. • Limit speeds to 10 miles per hour or less on unpaved areas within construction sites on un-stabilized (and unpaved) roads. • Post visible speed limit signs at construction site entrances. • Inspect and wash construction equipment vehicle tires, as necessary, so they are free of dirt before entering paved roadways, if applicable. • Provide gravel ramps of at least 20 feet in length at tire washing/cleaning stations, and ensure construction vehicles exit construction sites through treated entrance roadways, unless an alternative route has been approved by appropriate lead agencies, if applicable. • Use sandbags or equivalent effective measures to prevent run-off to roadways in construction areas adjacent to paved roadways. Ensure consistency with the project's Storm Water Pollution Prevention Plan, if such a plan is required for the project • Sweep the first 500 feet of paved roads exiting construction sites, other unpaved roads en route from the construction site, or construction staging areas whenever dirt or runoff from construction activity is visible on paved roads, or at least twice daily (less during periods of precipitation). • Stabilize disturbed soils (after active construction activities are completed) with a non-toxic soil stabilizer, soil weighting agent, or other approved soil stabilizing method. • Cover or treat soil storage piles with appropriate dust suppressant compounds and disturbed areas that remain inactive for longer than 10 days. Provide vehicles (used to transport solid bulk material on public roadways and that have potential to cause visible emissions) with covers. Alternatively, sufficiently wet and load materials onto the trucks in a manner to provide at least one foot of freeboard. • Use wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) where soils are disturbed in construction, access and maintenance routes, and materials stock pile areas. Keep related windbreaks in place until the soil is stabilized or permanently covered with vegetation.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.

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					o Mobile and Stationary Source Controls: • If practicable, lease new, clean equipment meeting the most stringent of applicable Federal 1 or State Standards.2 In general, commit to the best available emissions control technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible.3 • Where Tier 4 engines are not available, use construction diesel engines with a rating of 50 hp or higher that meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines,4 unless such engines are not available. • Where Tier 3 engine is not available for off-road equipment larger than 100 hp, use a Tier 2 engine, or an engine equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides and diesel particulate matter to no more than Tier 2 levels. • Consider using electric vehicles, natural gas, biodiesel, or other alternative fuels during construction and operation phases to reduce the project's criteria and greenhouse gas emissions. • Plan construction scheduling to minimize vehicle trips. • Limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections. • Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, prevent tampering, and conduct unscheduled inspections to ensure these measures are followed. o Administrative controls: • Develop a construction traffic and parking management plan that maintains traffic flow and plan construction to minimize vehicle trips. • Identify any sensitive receptors in the project area, such as children, elderly, and the infirm, and specify the means by which impacts to these populations will be minimized (e.g. locate construction equipment and staging zones away from sensitive receptors and building air intakes). • Include provisions for monitoring fugitive dust in the fugitive dust control plan and initiate increased mitigation measures to abate any visible dust plumes.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Infrastructure	Hardening of Infrastructure We understand that FirstNet will likely utilize existing commercial infrastructure to the maximum extent possible in its deployment of the Public Safety Broadband Network. Most likely, existing cellular towers, transport backhaul and data centers will need to be hardened to meet the stringent requirements of the PSBN. Hardening typically includes back up power supply, incorporating backhaul that is not easily disrupted (microwave or satellite), and stockpiling portable sites (Cell on Light Trucks or Cell on Wheels). Some of the larger cell phone companies have been hardening their infrastructure in disaster prone areas. Recommendation: The DPEIS should discuss the need for hardening sites, the use of portable equipment and the need for redundant or alternative backhaul equipment. FirstNet should commit to using as much commercially available equipment as possible and consider using as much renewable energy sources for backup power as is economically feasible.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Climate Change	Climate Change Scientific evidence supports the concern that continued increases in greenhouse gas emissions resulting from human activities will contribute to climate change. Global warming is caused by emissions of carbon dioxide and other heat-trapping gases. On December 7, 2009, the EPA determined that emissions of GHGs contribute to air pollution that "endangers public health and welfare" within the meaning of the Clean Air Act. One report indicates that observed changes in temperature, sea level, precipitation regime, fire frequency, and agricultural and ecological systems reveal .that parts of the western United States is already experiencing the measurable effects of climate change. 5 The report indicates that climate change could result in the following changes: poor air quality; more severe heat; increased wildfires; shifting vegetation; declining forest productivity; decreased spring snowpack; water shortages; a potential reduction in hydropower; a loss in winter recreation; agricultural damages from heat, pests, pathogens, and weeds; and rising sea levels resulting in shrinking beaches and increased coastal floods. Recommendation: The DPEIS should consider how climate change could potentially influence the proposed project, specifically within sensitive areas, and assess how the projected impacts could be exacerbated by climate change.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Waste	Hazardous Materials/Hazardous Waste/Solid Waste The DPEIS should address potential direct, indirect and cumulative impacts of hazardous waste from construction and operation of the proposed individual projects and facilities. The document should identify projected hazardous waste types and volumes, and expected storage, disposal, and management plans. It should address the applicability of state and federal hazardous waste requirements. Appropriate mitigation should be evaluated, including measures to minimize the generation of hazardous waste (i.e., hazardous waste minimization). Alternate industrial processes using less toxic materials should be evaluated as mitigation since such processes could reduce the volume or toxicity of hazardous materials requiring management and disposal as hazardous waste.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.

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12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Cumulative and Indirect Impacts	Cumulative and Indirect Impacts The cumulative impacts analysis should identify how resources, ecosystems, and communities in the vicinity of the project have already been, or will be, affected by past, present, or future activities in the project area. These resources should be characterized in terms of their response to change and capacity to withstand stresses. Trends data should be used to establish a baseline for the affected resources, to evaluate the significance of historical degradation, and to predict the environmental effects of the project components. For the cumulative impacts assessment, we recommend focusing on resources of concern or resources that are "at risk" and/or are significantly impacted by the proposed project, before mitigation. The EPA supports a regional assessment of the potential cumulative effects of other projects in the area to a range of resources, including aquatic, biological, and cultural resources. These findings should help inform current and future development proposed in the region. The EPA assisted in the preparation of a guidance document for assessing cumulative impacts in California that we find to be very useful. While this guidance was prepared for transportation projects in California, the principles and the 8-step process outlined therein can be applied to other types of projects and offers a systematic way to analyze cumulative impacts for a project. The guidance is available at: http://www.dot.ca.gov/ser/cumulative_guidance/purpose.htm. In accordance with this guidance, the EPA recommends that the DPEIS identify which resources are analyzed, which ones are not, and why. For each resource analyzed, the DPEIS should: • Identify the current condition of the resource as a measure of past impacts. For example, the percentage of species habitat lost to date. • Identify the trend in the condition of the resource as a measure of present impacts. For example, the health of the resource is improving, declining, or in stasis. • Identify all on-going, planned, and reasonably foreseeable projects in the study area that may contribute to cumulative impacts. • Identify the future condition of the resource based on an analysis of impacts from reasonably foreseeable projects or actions added to existing conditions and current trends. • Assess the cumulative impacts contribution of the proposed alternatives to the long-term health of the resource, and provide a specific measure for the projected impact from the proposed alternatives. • When cumulative impacts are identified for a resource, mitigation should be proposed. • Disclose the parties that would be responsible for avoiding, minimizing, and mitigating those adverse impacts. • Identify opportunities to avoid and minimize impacts, including working with other entities. Recommendations: The DPEIS should consider the cumulative impacts associated with other development projects proposed in the individual project areas and the potential impacts on various	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Cultural / Historic resources	Coordination with Tribal Governments Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000), was issued in order to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Indian tribes. Recommendation: The DPEIS should describe the process and outcome of government-to-government consultation between FirstNet and each of the tribal governments within the individual project areas, issues that were raised (if any), and how those issues were addressed in the selection of the proposed alternative.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
					National Historic Preservation Act and Executive Order 13007 Consultation for tribal cultural resources is required under Section 106 of the National Historic Preservation Act. Historic properties under the NHPA are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register. Section 106 of the NHPA requires a federal agency, upon determining that activities under its control could affect historic properties, consult with the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer. Under NEPA, any impacts to tribal, cultural, or other treaty resources must be discussed and mitigated. Section 106 of the NHPA requires that Federal agencies consider the effects of their actions on cultural resources, following regulation in 36 CFR 800. Executive Order 13007, Indian Sacred Sites (May 24, 1996), requires federal land managing agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian Religious practitioners, and to avoid adversely affecting the physical integrity, accessibility, or use of sacred sites. It is important to note that a sacred site may not meet the National Register criteria for a historic property and that, conversely, a historic property may not meet the criteria for a sacred site. Recommendation: The DPEIS should address the existence of Indian sacred sites in the individual project areas. It should address Executive Order 13007, distinguish it from Section 106 of the NHPA, and discuss how FirstNet will avoid adversely affecting the physical integrity, accessibility, or use of sacred sites, if they exist. The DPEIS should provide a summary of all coordination with Tribes and with the SHPO/THPO (if any), including identification of NRHP eligible sites, and development of a Cultural Resource Management Plan.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Environmental Justice	Environmental Justice and Impacted Communities Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994) and the Interagency Memorandum of Understanding on Environmental Justice (August 4, 2011) direct federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations, allowing those populations a meaningful opportunity to participate in the decision-making process. Guidance6 by CEQ clarifies the terms low-income and minority population (which includes Native Americans) and describes the factors to consider when evaluating disproportionately high and adverse human health effects. Recommendations: The DPEIS should discuss the potential need to evaluate environmental justice populations within the geographic scope of the individual projects. If such populations exist, the DPEIS should discuss the potential for disproportionate adverse impacts to minority and low-income populations, and the approaches used to foster public participation by these populations. Assessment of the projects impact on minority and low-income populations should reflect coordination with those affected populations. The DPEIS should discuss the potential need to provide outreach to all communities that could be affected by the individual projects.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.

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12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Land Use	Coordination with Land Use Planning Activities The DPEIS should discuss how the proposed action would support or conflict with the objectives of federal, state, tribal or local land use plans, policies and controls in the individual project areas. The term "land use plans" includes all types of formally adopted documents for land use planning, conservation, zoning and related regulatory requirements. Proposed plans not yet developed should also be addressed it they have been formally proposed by the appropriate government body in a written form (CEQ's Forty Questions, #23b).	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Email Attachment	Ann McPherson	U.S. Environmental Protection Agency Region IX	Public Health and Safety	Public Health and Safety - Valley Fever Coccidioidomycosis, (kok-sid-oy-doh-my-KOH-sis), or Valley Fever, is a fungal infection that is almost always acquired from the environment via the inhalation of fungal spores. It can affect humans, many species of mammals and some reptiles .7 The fungus, Coccidioides, is endemic in the soil of the southwestern United States, Mexico, and parts of Central and South America. Coccidioides can live for long periods of time in soil under harsh environmental conditions including heat, cold, and drought. 8 Coccidioides can be released into the air when soil containing the fungus is disturbed, either by strong winds or activities such as farming or construction. Distribution of the fungus is typically patchy, but in some "hot spots," up to 70% of the human population has been infected. The number of reported Valley Fever cases in the U.S. has risen from less than 5,000 in 2001 to more than 20,000 cases in 2011.9 An estimated 150,000 more cases go undiagnosed every year. The majority of reported cases are located in Arizona and California. 10 The reason for the recent increase in cases, however, is unclear. Dust storms in endemic areas are often followed by outbreaks of coccidioidomycosis. If the dust storms are severe, the fungal spores can be carried outside the endemic area into neighboring counties, where outbreaks follow. According to the Centers for Disease Control and Prevention, workers engaged in soil-disturbing activities in endemic areas should be considered at risk for the disease. 12 Occupational groups at risk include farmers, agricultural workers, construction workers and archaeologists. Some groups of people appear to be at increased risk for disseminated disease and can become seriously ill when infected. People at risk for severe disease include those with weakened immune systems, persons with cancer or who are on chemotherapy, or persons who are HIV-infected. Also at higher risk for serious illness are the elderly, persons of African or Filipino descent, and women in the third trimester of pregnancy. Recommendations: The EPA recommends that the DPEIS discuss potential exposures to the fungus, Coccidioides, and susceptibilities of workers and nearby residents to Valley Fever due to soil-disturbing activities of the project. The Environmental Awareness Program for the workers should include training on the health hazards of Valley Fever, how it is contracted, what symptoms to look for, proper work procedures, how to use personal protective equipment, the need to wash prior to eating, smoking or drinking and at the end of the shift, and the need to inform the supervisor of suspected symptoms of work- related Valley Fever. The training should identify those groups of individuals most at risk and urge individuals to seek prompt medical treatment if Valley Fever symptoms (flu-like illness with cough, fever, chest pain, headache, muscle aches, and tiredness) develop.	The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.
12/29/2014	Mail	Diana Rhoades	Public	Cultural / Historic resources	Dear Ms. Pereira, Tumamoc Hill is a sacred place. It is on the National Register of Historic Places. It is a landmark, it is a University research station, studying plants and the changes in climate since 1903. It is a national archeological district, a burial ground for Native American People. It was an early trading post for the First People. It is rich in natural and cultural history. It should not be a place where the government places large towers or builds huge power lines. I hope you will carefully consider all the implications of FirstNet. All my best Diana Rhoades	Thank you for your comment.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
12/29/2014	Email	Doug Gann, Ph.D.	Archaeology Southwest	Cultural / Historic resources	Dear Firstnet I am writing in support of what I understand will be a new installation for our first responders on top of Tumamoc Hill in Tucson Arizona. I would like to offer the suggestion that Firstnet keep any new construction to areas of this hilltop that have already been disturbed by previous construction activities. We have known Tumamoc was an important archaeological site for 100 years, but it has only been in the past 10 years that the evidence has been understood in proper contexts. The ancient homes built on Tumamoc were constructed at the beginning of what we now know of as the ancient southwest culture area. The Cliff Dwellings in Mesa Verde, the stunning buildings of Chaco Canyon, the 5 story adobe Casa Grande, all of these places were built by a people who apparently got their start 4000 years ago, along the Santa Cruz River, where modern Tucson sits today. Though partially disturbed, the village on top of Tumamoc still contains evidence about how this pan-Southwestern culture began. What has not been destroyed should be preserved when ever possible. I think everyone in the archaeological community believes that your project needs to be supported, our community's safety has to come first. However, if new construction can be steered away from archaeologically critical areas, we also believe that we can achieve a win-win scenario here. Best Wishes, Doug Gann, Ph.D. Preservation Archaeologist	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
12/29/2014	Email	Scott Sysum	U.S. Environmental Protection Agency Region IX	NOI	Dear Ms. Pereira I have been assigned as the lead reviewer for the U.S. EPA Region 9 for the FirstNet National Public Safety Broadband Network PEIS Project. I have attached a pdf file of our scoping comment letter regarding this project. The signed letter was mailed today to Ms. Amanda Pereira. Thank you for providing us the opportunity to review this interesting project. Please feel free to contact us if you have any questions, seek clarifications or if we can help in any other way. v/r Scott Sysum	Thank you for your comment.
12/30/2014	Email Attachment		Public	Alternatives	The FirstNet Dilemma In order for FirstNet to succeed, it must provide broadband wireless service to public safety users for less than market rates. In addition, the FirstNet infrastructure must be more robust and more resilient than commercial wireless networks. The only way for FirstNet to achieve both of these goals is to leverage excess Nationwide Public Safety Broadband Network (NPSBN) capacity to create a revenue stream that subsidizes public safety user recurring monthly fees to the point that no commercial operator can undercut them. If the recurring monthly fees charged to public safety users by FirstNet is not significantly lower than commercial wireless rates, the commercial networks will likely simply lower their rates for public safety subscribers to undercut and undermine FirstNet. Financially strapped localities will likely choose the less expensive commercial network rather than subscribe to FirstNet, despite the fact that FirstNet will offer priority access to a more robust network. If such a scenario plays out, FirstNet will fail. Rather than becoming a customer of commercial wireless network operators, public safety should leverage the excess capacity in the NPSBN so that commercial operators and other secondary users become FirstNet customers, not vice versa. If Public Safety does not control the network, it will never achieve its goal of unrestricted priority access to broadband wireless, supported by a public safety grade (bulletproof) network infrastructure. One way to address the FirstNet Dilemma is for FirstNet to petition the FCC to issue an Order that would require all new 700MHz. broadband wireless subscriber devices be capable of accessing FirstNet spectrum (Band 14). This single regulatory action would create an immediate market for FirstNet spectrum, even in the absence of a deployed network. By creating an environment that ensures that band 14 capable devices become ubiquitous, the FCC Order would increase the value of FirstNet spectrum to potential lessees, enabling FirstNet to generate a revenue stream prior to the deployment of the NPSBN simply by leasing the spectrum until the NPSBN is ready to deploy in a given locale. In addition, the FCC Order would ensure the availability of band 14 devices and substantially lower their cost to public safety users when the NPSBN is deployed. Every day that FirstNet spectrum lays fallow is a lost opportunity to generate revenue that could help fund NPSBN construction, deployment and ongoing operating expenses. Once the NPSBN is deployed, FirstNet (or the designated local network operator) could continue to lease excess NPSBN capacity to secondary users through a public private partnership, thus reducing public safety user recurring user recurring monthly fees to a level far below commercial market rates, whilst encouraging public safety network participation and discouraging potential competitors.	Thank you for your comment.
12/31/2014	Email	Patricia A. Gilman, Ph.D., RPA	University of Arizona	Cultural / Historic resources	Ms. Pereira, I am writing in support of the idea that FirstNet use the existing antenna pads on Tumamoc Hill in Tucson. The entire top and sides of the hill are an archaeological site that is very important in the history of Tucson. It has hundreds of rock-ringed houses that are about 2000 years old along with petroglyphs and a very early community building. For an archaeologist like me, it is a very cool site because it has told us about the lives of people living at this time in the Tucson Basin. The site is unique, by the way. There are no others like it, which suggests its importance. Most of the site has not been excavated, and so there is much more we could learn here. But the most important thing is to preserve the site for the future so that others, both the public and archaeologists, can appreciate the lives of these people. Please do the right thing for the history of Tucson and use only the existing antenna pads. That way, everyone gets what they want and need. Thank you for you attention to this. Patricia A. Gilman, Ph.D., RPA	FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.
1/1/2015	Email	Paul Mirocha	Public	Aesthetics / Recreational Use	Dear Amanda, Mike Rosenzweig, my boss at Tumamoc: People and Habitats, asked me to comment on my perspective on Tumamoc Hill. I have been artist-in-residence there since 2011. You can see a more of what I've done there on my blog: http://TumamocSketchbook.com.	Thank you for your comment.
1/1/2015	Email	Paul Mirocha	Public	Geology	What is Tumamoc Hill? It's a highly protected natural wild-lands Sonoran Desert mountain, National Historic Landmark, ecological research preserve, U.S. Archaeological District, and community icon—all of two miles from downtown and surrounded by growing urban Tucson. But there is no single description of Tumamoc Hill that is complete. There are many layers to the place, with different meanings depending on who you are talking to. A geologist will tell you that Tumamoc is an inselberg of volcanic rock remaining from eruptions between 20 – 30 million years ago. And it originally was formed near what is now the Santa Catalina Mountains.	Thank you for your comment.
1/1/2015	Email	Paul Mirocha	Public	Cultural / Historic resources	A paleontologist will tell you that the current Sonoran Desert environment came about 8–15 million years ago during a drying trend, when the unique desert plants here evolved from tropical ancestors moving north from Mexico. The Tohono O'odham call it Cemamagĭ Doag, "Horned Lizard Mountain." The Hill is considered a sacred ancestral site for O'odham, Yaqui, and Hopi Indians.	Thank you for your comment.
1/1/2015	Email	Paul Mirocha	Public	Infrastructure	The summit is now a site for a number of communications and homeland security communications towers, yet this role has probably been played for thousands of years. We know that up until historic times, Sentinal Peak, Tumamoc's sister peak was used, for it's broad view of the valley, as a lookout post, especially for marauding Apaches.	Thank you for your comment.

Date Rec'd	Format	Name	Organization	Topic	Comment	Response
1/1/2015	Email	Paul Mirocha	Public	Cultural / Historic resources	It has been called many names. Lawrence Clark Powell, famed librarian and writer who lived in Tucson, called Tumamoc "Tucson's Acropolis." It's been called by various names, including "A Mecca for botanists, and "The Jerusalem of desert rats."	Thank you for your comment.
1/1/2015	Email	Paul Mirocha	Public	Biological Resources	The first thing a modern ecologist will say to you is "don't stray off the road." Beginning with the establishment of the Desert Botanical Laboratory in 1903 by the Carnegie Institution of Washington, Tumamoc is the oldest continually monitored ecological research preserve in the world, with data from over 100 years of study. This is the world's first restoration ecology project. The nature here is to look at, to study, to appreciate, but not to exploit–not even to use.	Thank you for your comment.
1/1/2015	Email	Paul Mirocha	Public	Cultural / Historic resources	To an archeologist, Tumamoc is a mystery that would challenge even Sherlock Holmes. Ruins of cultures living on Tumamoc go back 3,500 years, and at various times in prehistory, the Tumamoc hilltop was probably an important landmark, cultural focal point, and ceremonial ground.	Thank you for your comment.
1/1/2015	Email	Paul Mirocha	Public	Aesthetics / Recreational Use	To the thousands of people who walk the road daily (only authorized vehicles are allowed) Tumamoc is the best workout in town, a treadmill with a spectacular view. It's a source of healing and health. It's a place where one can stroll among grazing deer five minutes from downtown. Dig a little deeper and many walkers will confide that Tumamoc is a very personal emotional or spiritual sanctuary.	Thank you for your comment.
1/1/2015	Email	Paul Mirocha	Public	Cultural / Historic resources	Urban culture and ecological research can co-exist on Tumamoc Hill. It is a sanctuary for humans as well as other Sonoran Desert life forms, but the boundaries are clear: no one steps off the road without special permission. Scientists have protected the Hill for the last century. Now it's up to the community to take part in stewardship of the Hill as a special place and a cultural value for the next 100 years. At that time, we'll check in again and see how it's going. In the mean time I urge Firstnet to join the other institutions, groups, and governmental entities that are united as part of the stewardship of this valuable site. best regards, Paul Mirocha	Thank you for your comment.
1/3/2015	Email	Marc Severson	Public	Cultural / Historic resources	Dear Ms. Periera, I am writing to urge you to protect the cultural resources on the top of Tumamoc Hill in Tucson. This historic/prehistoric site has unique constructions that give insight into the prehistory of the Southwest. Further constructions endangers these resources. There are archaeological resources on and around this site that are irreplaceable. Considerable damage has already occurred over the years. I urge you to limit construction on this site to areas that have been previously disturbed and allow no further destruction of these resources. Thank you, Marc Severson	Thank you for your comment.
1/6/2015	Email	Matt Goode	University of Arizona	Biological Resources	Dear Ms. Pereira, I am a Research Scientist at the University of Arizona and my lab is situated on Tumamoc Hill. I am writing to let you know how important Tumamoc Hill is to me and my students, as well as the community of Tucson. I have been conducting research on reptiles on Tumamoc for the past three years. Besides providing us with an incredible opportunity to better understand how reptiles persist in fragmented habitats, Tumamoc also enables us to provide unprecedented opportunities to educate the general public about scientific research and conservation of natural resources. Your help in keeping Tumamoc Hill healthy and productive is greatly appreciated by a lot of diverse stakeholders who care about Tucson's history and it's future! Thank you so much for your support! Matt	Thank you for your comment.

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APPENDIX C – ENVIRONMENTAL LAWS AND REGULATIONS

The proposed implementation of the Proposed Action must meet the requirements of the National Environmental Policy Act and other applicable federal laws and regulations, Executive Orders, and implementing guidance for the resource areas evaluated in the Programmatic Environmental Impact Statement. Titles are listed alphabetically.

Table C-1: Applicable Laws and Regulations, Executive Orders, and Guidance

Title	Description
Laws and Regulations	
American Indian Religious Freedom Act (AIRFA) (*42 United States Code [USC] §1996*)	Protects and preserves for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Alaska Native, and Native Hawaiians, including access to culturally significant sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.
Archaeological Resources Protection Act of 1979 (ARPA) (*16 USC §§470aa-470mm; Public Law [PL] 96-95*)	Establishes requirements to protect archaeological resources and sites on public lands and Indian lands, including civil and criminal penalties for the destruction or alteration of cultural resources.
Bald and Golden Eagle Protection Act (*16 USC §668 et seq.*)	Prohibits the taking, possession, sale, purchase, barter, or offer to sell, purchase, or barter, export, or import of any part of a bald eagle or golden eagle.
Clean Air Act (CAA) (*42 USC §§7401-7671g*)	Protects air quality; authorizes the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards for six criteria pollutants that threaten human health and welfare: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), and particulate matter with a diameter equal to or less than 10 microns (PM_{10}) or less than 2.5 microns (fine particles) ($PM_{2.5}$). Includes provisions for reducing soil erosion to preserve air quality.
Coastal Barrier Improvement Act of 1990 (CBIA) (*PL, 101-591*)	Adds additional areas to the Coastal Barrier Resources System and secondary barriers within large embayments (coastline indentations that form a bay), and establishes a process to transfer interests in land to public or non-profit conservation organizations.
Coastal Barrier Resources Act of 1982 (CBRA) (*PL 97–348*)	Established the John H Chafee Coastal Barrier Resource System to protect sensitive and vulnerable barrier islands found along the U.S. Atlantic, Gulf, and Great Lakes coastlines, as well as Puerto Rico and the U.S. Virgin Islands.
Coastal Zone Management Act (CZMA) *(16 USC § 1451 et seq.)*	Enacted to protect the coastal environment from growing demands associated with residential, recreational, commercial and industrial uses. Coastal states with an approved Coastal Zone Management Plan identifying permissible land and water use within the state's coastal zone can review federal actions for federal consistency to determine if the actions are consistent with the state program's enforceable policies.

Title	Description
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA - Superfund Law) (*42 USC §9601*)	Authorizes the USEPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. Requires the USEPA to establish criteria for determining priorities among releases (or threatened releases) of hazardous substances for the purpose of taking remedial action.
Construction, Marking, and Lighting of Antenna Structures of the Federal Communications Commission regulations, Part 17 *(47 Code of Federal Regulations [CFR] Chapter 1*)	Governs communications infrastructure under Part 17, which prescribes procedures for antenna structure registration and requires the Federal Aviation Administration (FAA) to conduct an aeronautical study of the navigation airspace to determine appropriate tower marking and lighting requirements for safe airspace. Before the Federal Communications Commission authorizes the construction of new antennae or alteration of existing antennae structures, an FAA determination of "no hazard" may be required. FAA notification is required for new any construction greater than 200 feet above the ground, and near an airport runway (taller than 100:1 for a horizontal distance of 20,000 feet, 50:1 for a horizontal distance of 10,000 feet, and 25:1 for a horizontal distance of 5,000 feet of a heliport). The FAA can vary marking and lighting when requested if aviation safety is not compromised.
Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) (*40 CFR Parts 1500-1508*)	Provides direction to ensure compliance with procedures to achieve the goals of NEPA. Public officials are able to make decisions based on understanding of environmental consequences and take actions to protect, restore, and enhance the environment.
Critical Infrastructure Protection Act of 2001 (*42 USC 5195*)	Defines critical infrastructure as the assets, systems, and networks (physical or virtual) vital to the U.S., which if incapacitated or destroyed, would have a debilitating effect on security, national economic security, public health or safety, or a combination of these.
Disaster Mitigation Act of 2000 (DMA 2000) (*PL 106-390*)	Establishes the basis for Federal Environmental Management Agency disaster mitigation planning requirements as a condition of mitigation grant assistance to states, tribes, and local governments. Mitigation planning may be incorporated into a comprehensive master plan identifying hazards, analyzing risks, establishing priorities, and describing specific actions to address those risks.
Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (*42 USC §§11004-11049*)	Improves community access to information about chemical hazards and facilitates the development of chemical emergency response plans by states, tribes, and local governments. Establishes the Toxic Release Inventory to inform the public about potentially dangerous chemicals in their community.
Endangered Species Act (ESA) of 1973 (*16 USC §1531 et seq.*)	Ensures the protection and recovery of imperiled species and the habitats upon which they depend. Prohibits take, which is defined as harming, up to and including killing, or harassing a listed species. Section 7 of the ESA requires federal agencies to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the threatened or endangered species or result in destruction or adverse modification of critical habitat.

Title	Description
Energy Independence and Security Act of 2007 (*PL 110-140*)	Expands the production of renewable fuels and contains provisions for energy efficiency, smart grid, and carbon dioxide and incentives for plug-in hybrid electric vehicles to assist the electric power industry's efforts to reduce greenhouse gas emissions.
Energy Policy Act of 2005 (*PL 109-58*)	Provides tax incentives and loan guarantees for energy production of various types.
Farmland Protection Policy Act of 1981 (FPPA) (*PL 97–98, 7 USC §4201*)	Requires federal agencies to examine the potentially adverse effects to "prime" and "unique" farmland resources before approving any action that would irreversibly convert farmlands to non-farm uses.
Federal Facility Compliance Act of 1992 (*PL 102–386*)	Amends the Solid Waste Disposal Act and expands the enforcement authority of federal and state regulators with respect to solid and hazardous waste management at federal facilities. Requires federal facilities to pay any nondiscriminatory fees or service charges assessed in connection with a federal, state, interstate, or local solid or hazardous waste regulatory program. Waives immunity for federal facilities under solid and hazardous waste laws by allowing states to fine and penalize for violations.
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (*7 USC §136 et seq.*)	Provides for federal regulation of pesticide distribution, sale, and use.
Federal Land Policy and Management Act of 1976 (*43 USC §1701 et seq.*)	Directs management of public lands, administered by the Bureau of Land Management, to protect the quality of the land and preserve certain public lands in their natural conditions.
Federal Telecommunications Act of 1996	Establishes general criteria for the siting of telecommunication facilities.
Federal Water Pollution Control Act (Clean Water Act – CWA) (*33 USC §1251 et seq.*)	Protects water quality and aims to restore and maintain the chemical, physical, and biological integrity of "waters of the United States." Section 303(d) requires states and USEPA to identify waters not meeting state water quality standards and to develop total maximum daily loads, defined as the maximum amount of a pollutant a waterbody can receive and still meet water quality standards. After determining total maximum daily loads for impaired waters, states are required to identify all point and nonpoint sources (runoff) of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source in order to meet the state standards. Section 320 establishes the National Estuary Program, which identifies nationally significant estuaries threatened by pollution, and requires federal grants to states, interstate, and regional water pollution control agencies to prepare and implement conservation and management plans. Section 404 addresses prohibition and permitting for dredged materials and fill material into waters of the United States.
Fish and Wildlife Conservation Act of 1980 (*16 USC §§2901-2911*)	Declares that fish and wildlife are of ecological, educational, aesthetic, cultural, recreational, economic, and scientific value to the nation, and encourages all federal agencies to conserve and promote conservation of non-game fish and wildlife and their habitats.

Title	Description
Fish and Wildlife Coordination Act of 1934 (*16 USC §§661-667e*)	Mandates that fish and wildlife resources receive adequate and equal consideration in conjunction with other values during the planning of water resources development projects that may conflict with the goal of conserving fish and wildlife resources.
Flood Plain Management Criteria for Flood-prone Areas (*44 CFR Part 60.3*)	Provides guidance on Federal Emergency Management Agency floodplain management criteria for land management and use.
Intermodal Surface Transportation Efficiency Act of 1991 (*23 USC §101 [note]*)	Establishes new U.S. transportation planning and policy for highway construction, highway safety, and mass transit funding. Provides funds for the Bridge Replacement and Rehabilitation Program, Scenic Byways Program, pedestrian and bicycle facilities (such as pedestrian bridges), and designation of high-speed rail corridors.
Landownership Adjustments *(36 CFR Part 254*)	Sets procedures for conducting exchanges of National Forest System lands and requires consideration of the public interest, including protection of fish and wildlife habitats, cultural resources, watersheds, and wilderness and aesthetic values, as well as enhancement of recreation opportunities and public access.
Magnuson-Stevens Fishery Conservation and Management Act of 1976 (*16 USC §§1801-1882*)	Requires conservation and management of U.S. fishery resources through implementation of fishery management plans and Regional Fishery Management Councils. Fishery management plans enable stakeholders to participate in the administration of fisheries, consider social and economic needs of states, develop underutilized fisheries, and protect essential fish habitats.
Marine Mammal Protection Act of 1972 (MMPA)	Prohibits the taking of marine mammals and enacts moratoriums on imports, exports, and sales of marine mammals and marine mammal parts or products within the United States. Defines "take" as "the act of hunting, killing, capture, and/or harassment of any marine mammal; or, the attempt at such." Defines "harassment" as "any act of pursuit, torment or annoyance" that has potential to injure or disturb a marine mammal.
Marine Protection, Research, and Sanctuaries Act of 1972 (*33 USC §§1401–1445*)	Establishes the marine sanctuaries program and provides a permitting process for the dumping of materials, including dredged materials, into U.S. ocean water.
Migratory Bird Treaty Act (MBTA) (*16 USC §§703-712*)	Regulates the taking, possession, import, export, transport, sale, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit.
National Environmental Policy Act (NEPA) *(42 USC 4321 et seq.)*	Requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their Proposed Actions and reasonable alternatives to those actions. Established CEQ; CEQ promulgated regulations implementing NEPA, which are binding on all federal agencies, to address the procedural provisions of NEPA and the administration of the NEPA process, including preparation of Environmental Impact Statements.

Title	Description
National Forest Management Act of 1976 (*PL 94-588*) National Forest System Land and Resource Management Planning (*36 CFR Part 219*)	Governs the administration of national forests and removal of trees. Includes requirements for consideration, treatment, and protection of intangible resources such as scenery and aesthetics.
National Historic Preservation Act (NHPA) *(formerly 16 USC § 470 et seq., now 54 USC § 100101 et seq.)*	Ensures protection of cultural resources and historic properties. Established the Advisory Council on Historic Preservation (ACHP) to promote the preservation, enhancement, and productive use of our nation's historic resources. Authorizes the Secretary of the Interior to maintain a National Register of Historic Places composed of districts, sites, buildings, structures, and objects significant in American history and culture. Section 106 of the NHPA requires federal agencies to identify the effects of proposed actions on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. Under Section 106, the NHPA requires that federal agencies consult with federally-recognized Indian tribes and Native Hawaiian Organizations that attach traditional religious and cultural significance to eligible or listed historic properties that may be affected by the agency's actions.
National Marine Sanctuaries Act (*16 USC §1431 et seq.*)	Authorizes the Secretary of Commerce to designate national marine sanctuaries based on statutory criteria and specifies consultation requirements.
National Trails System Act of 1968 (*16 USC §1241*)	Authorizes the Secretary of Agriculture to administer and manage national scenic trails for conservation and enjoyment.
Native American Graves Protection and Repatriation Act (NAGPRA) (*PL 101–601, 104 Stat. 3048*)	Establishes a process for museums and federal agencies to manage certain Native American cultural items in their possession or inadvertently discovered during a project; establishes the rights of Native American lineal descendants, American Indian tribes, and Native Hawaiian organizations with respect to the treatment, repatriation, and disposition of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony (referred to collectively in the statute as cultural items), with which they can show a relationship of lineal descent or cultural affiliation.
North American Wetlands Conservation Act of 1989 (*PL 101-233*)	Recognizes the aesthetic values of fish, shellfish, and other wildlife, and recognizes that wetlands provide aquatic areas important for recreational and aesthetic purposes. Federal agencies (to the extent possible) should cooperate to restore, protect, and enhance wetlands and other habitats for migratory birds, fish, and wildlife.
Occupational Safety and Health Act (OSHA) of 1970 (*PL 91-596*)	Mandates that employers provide a safe place of employment, free from hazards to safety and health.
Plant Protection Act (*7 USC §7701 et seq.*)	Establishes a program to control the spread of noxious weeds.
Procedures for Abatement of Highway Traffic Noise and Construction Noise (*23 CFR 772*)	Establishes procedures for conducting noise studies and implementing noise abatement measures, and provides guidelines to plan and design highway projects.

Title	Description
Resource Conservation and Recovery Act of 1976 (*40 CFR Parts 239-282*)	Amends the Solid Waste Disposal Act of 1965 to address how to safely manage and dispose of municipal and industrial waste generated nationwide. Identifies more stringent hazardous waste management standards, and a comprehensive regulatory program for underground storage tanks that store petroleum or certain hazardous materials.
Rivers and Harbors Act of 1899 (*33 USC §403*)	Addresses projects and activities in navigable waters and harbor and river improvements and prohibits the unauthorized obstruction or alteration of any navigable water of the United States, including altering any port, harbor, or channel.
Safe Drinking Water Act (*42 USC §§300d-300j-9*, as amended by *PL 93-523*)	Protects public health by regulating the nation's public drinking water and its sources, including protection of surface water and groundwater. Section 1424(e) of the Safe Drinking Water Act authorizes the Sole Source Aquifer Protection Program. Sole source aquifers are the sole or principal source of drinking water for an area, defined as providing 50 percent or more an area's drinking water supply. Any federally funded proposed project with the potential to contaminate a designated sole source aquifer is subject to USEPA review.
Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (*PL 109–59*)	Addresses maintenance and growth challenges of the U.S. transportation system (e.g., improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment). Regulates efforts to address national transportation problems and provides state and local decision makers the flexibility to solve transportation problems at the regional and local levels.
Superfund Amendments and Reauthorization Act of 1986 (SARA) (*PL 99-499*)	Amends the Comprehensive Environmental Response, Compensation, and Liability Act as a result of lessons learned from managing the Superfund program. Stresses the importance of permanent remedies and innovative treatment technologies in cleaning up hazardous waste sites, encourages greater citizen participation in cleanup decisions, and increases the size of the trust fund.
Toxic Substances Control Act of 1976 (TSCA) (*15 USC Chapter 53*)	Gives the USEPA the authority to require reporting, record-keeping, and testing relating to toxic chemical substances or mixtures.
Wild and Scenic Rivers Act (*16 USC §§1271–1287*) Wild and Scenic Rivers (*36 CFR Part 297*)	Provides for a Wild and Scenic River System by recognizing the remarkable values (scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values) of specific rivers of the United States. The Wild and Scenic Rivers designation includes requirements for the protection of scenic and natural values from the effects of any water resources project.
Wilderness Act of 1964 (*16 USC §1131*)	Provides for the preservation of wilderness character and protects and manages the natural conditions of wilderness areas to negate the impact of humankind.
Executive Orders	
Executive Order 11988 Floodplain Management	Requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

Title	Description
Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Ensures that federal agencies avoid taking actions that have a disproportionately high and adverse impact on low-income populations or minority populations. Emphasizes the importance of NEPA's public participation process, directing that each federal agency shall provide opportunities for community input in the NEPA process.
Executive Order 13007 Indian Sacred Sites	Directs federal agencies to accommodate access to and avoid adversely affecting American Indian sacred sites.
Executive Order 13089 Coral Reef Protection	Directs federal agencies to avoid degradation of coral reef ecosystems and implement measures to restore affected ecosystems.
Executive Order 13112 Invasive Species	Directs federal agencies to prevent the introduction of plant, animal, and microorganism invasive species, and control and minimize the economic, ecologic, and human health impacts that invasive species may cause.
Executive Order 13175 Consultation and Coordination with Indian Tribal Governments	Reaffirms the federal government's commitment to tribal sovereignty, self-determination, and self-government. Its purpose is to ensure that all Executive departments and agencies consult with Indian tribes and respect tribal sovereignty as they develop policy on issues that impact Indian communities.
Executive Order 13340 Great Lakes Interagency Task Force and Promotion of a Regional Collaboration of National Significance for the Great Lakes	Specifies 11 federal agency and Cabinet-level departments to provide strategic direction on federal Great Lakes policies, priorities, and programs.
Executive Order 13547 Stewardship of the Ocean, Our Coasts, and the Great Lakes	Provides national policy to ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources.
Executive Order 13653 Preparing the United States for the Impacts of Climate Change	Directs federal agencies to take steps that will make it easier for American communities to strengthen their resilience to climate change impacts.
Executive Order 13690 Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input	Implements the Federal Flood Risk Management Standard as part of a national policy on resilience and risk reduction, consistent with the President's Climate Action Plan. Amends EO 11988, and emphasizes consideration by agencies of ecosystem-based alternatives and long-term resilience and risk reduction when managing flood risks.
Executive Order 13693 Planning for Federal Sustainability in the Next Decade	Establishes target of 40 percent greenhouse gas emission reduction for federal operations by 2025, relative to a fiscal year 2008 baseline. Primary emphasis is on increasing energy efficiency before considering renewable energy and alternative fuels. Federal agencies will continue to prepare annual Strategic Sustainability Performance Plans for Council on Environmental Quality review.

Title	Description
Guidance	
Council on Environmental Quality Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions	Provides guidance on how to incorporate the environmental effects of greenhouse gas emissions and the relationship of climate change in NEPA documentation.

APPENDIX D – ENVIRONMENTAL JUSTICE METHODOLOGY

FirstNet Methodology to Screen for Potential Environmental Justice Populations

This appendix explains the methodology used in this Programmatic Environmental Impact Statement (PEIS) to screen for the presence of potential environmental justice populations. The PEIS applies this methodology to every state and territory. Future analyses for site-specific actions may tier-off the results and methodology of this PEIS (see Section 1.2).

The first step in developing a screening methodology is to determine the types of communities that are relevant. The Council on Environmental Quality (CEQ) defines both place-based and non-place based communities for environmental justice consideration. Specifically, "agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect." (CEQ, 1997)

Telecommunications projects could have effects on place-based minority or low-income populations, meaning populations of individuals "living in geographic proximity" to one another and to an action such as placement of a telecommunications tower. Potentially, such projects could affect place-based environmental justice communities disproportionately due to localized human health or environmental effects. (The focus in environmental justice assessments is always on adverse effects, but telecommunications projects could also have beneficial effects such as improvements in police, fire, and emergency medical services. The Environmental Consequences section for infrastructure addresses such effects.) Telecommunications projects would be very unlikely to affect disproportionately any populations that are not place-based. Because FirstNet is such a broad program, it would affect at the same rate and intensity the general population and groups not defined by where they live, such as migrant workers, other types of workers that disproportionately fall into particular minority categories, racial and ethnic groups in general, and Native American Tribes as dispersed entities.

Identifying potential place-based environmental justice communities involves screening geographic areas for minority and low-income populations. This requires choosing the appropriate geographic units of analysis, the appropriate general population comparison group, and the appropriate metrics for classifying populations according to the CEQ definitions. The following paragraphs address each consideration in turn.

Any adverse effects of FirstNet projects are most likely to manifest at a local level. For example, dust and noise exposure from construction of communication towers, changes in property values, and any adverse radiation from operation of communications equipment – should these be actual impacts – would affect people in proximity to those activities. Therefore, the environmental justice population screening analysis in this PEIS uses the smallest geographic unit for which regularly updated socioeconomic data are readily available, the census block group (BG).

The Census Bureau defines this unit as follows:

> "Block Groups are statistical divisions of census tracts, [and] are generally defined to contain between 600 and 3,000 people. … A BG usually covers a contiguous area. … BGs never cross state, county, or census tract boundaries but may cross the boundaries of any other geographic entity." (U.S. Census Bureau, 2015a)

In dense inner city areas, a BG may only encompass a few city blocks. In rural areas, a BG may cover many square miles.

Regarding the choice of general population comparison group, this PEIS uses each state's population as the comparison group, hereafter called the reference population. This is because: a) states are the fundamental analysis units for the PEIS as a whole, and b) states vary considerably in their demographic and economic conditions, thus it would not be appropriate to compare BG figures to national figures on population by minority group or poverty status.

The choice of appropriate metrics for identifying minority populations and low-income populations is somewhat complicated. The CEQ provides some basic guidance. Additional aspects are discretionary and are matters of precedent and best practice within particular agencies and among socioeconomic analysts.

The CEQ provides the following direction on minority populations:

> "Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50% or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." (CEQ, 1997)

The CEQ does not define "meaningfully greater." In practice, many analysts use varying percentages above the reference population's percentage of individual minority groups (e.g., Asian or Hispanic) or combined minority groups.

The CEQ also directs that "Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty" (CEQ, 1997). Poverty thresholds are specific income levels that take into account factors such as family size and the ages of family members. The federal government defines these levels annually for the nation. The CEQ does not provide additional direction on applying poverty thresholds. In practice, many analysts use varying percentages above the reference population's percentage of people with incomes at or below the poverty level.

Minority and low-income populations are each of concern in environmental justice assessments. If a block group meets either the minority criteria or the low-income criteria, it is considered a potential environmental justice population.

This PEIS uses several different criteria (thresholds) in a screening methodology designed to identify degrees of likelihood that a BG contains a potential environmental justice population.

These thresholds are:

a) An absolute threshold of over 50 percent of the BG's population being of minority status. This is a CEQ-defined threshold as noted above (CEQ, 1997).
b) An absolute threshold of 20 percent or more of the BG's population living in poverty. This is the Census Bureau's definition of a "poverty area" (Bishaw, 2014).
c) A meaningfully greater threshold of 20 percentage points greater than the reference population's minority population, whether an individual minority population or combined minority population. For example, if the combined minority population in the reference population is 10 percent, the threshold applied to each BG is 30 percent. This is the U.S. Department of Housing and Urban Development's definition of a "minority neighborhood" (U.S. Department of Housing and Urban Development, 2015). An example of a recent, multi-state PEIS that used this threshold is the *Approved Resource Management Plan Amendments/Record of Decision (ROD) for Solar Energy Development in Six Southwestern States* (U.S. Bureau of Land Management, 2012). Its *Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States* (U.S. Bureau of Land Management and U.S. Department of Energy, 2010) provides the environmental justice screening analysis (see Chapter 4, Affected Environment, and the individual state affected environment and impact assessment chapters).
d) A meaningfully greater threshold of 120 percent of the reference population's minority population (individual minority or combined minority population). For example, if the minority population in the reference population is 10 percent, the threshold applied to each BG is 12 percent. However, using this as the sole criterion at the BG level would be problematic because it may mis-identify the environmental justice potential of many BGs.[1]
e) A meaningfully greater threshold of 120 percent of the reference population's percentage of individuals living with incomes below 200 percent of the federal poverty level. For example, if 25 percent of the reference population is below 200 percent of the poverty level, the threshold applied to each BG is 30 percent. This approach aligns with the U.S. Environmental Protection Agency's (USEPA) approach to defining "low income" in its recently released environmental justice screening tool, EJSCREEN. EPA's rationale for this threshold cites literature indicating that the "effects of income on baseline health and probably on other aspects of susceptibility are not limited to those [people] below the poverty thresholds," and the view of some socioeconomic analysts that "today's poverty thresholds are too low to adequately capture the populations adversely affected by low income levels." (USEPA, 2015) However, this definition broadens the definition of low-income provided by the CEQ (CEQ, 1997) and considerably increases the number of BGs identified as having environmental justice potential.

[1] For instance, if the reference population percentage for a specific minority is 1 percent, the threshold for defining a potential environmental justice population is 1.2 percent. If a BG has a total population of 1,000, the specific minority population equivalent to the reference population percentage is 10, and the threshold for defining an environmental justice population is 12. The difference of only two persons categorizes this BG as a potential environmental justice population. This is a questionable conclusion in terms of data fidelity (census and sampling errors), and whether such small differences truly are meaningful in the environmental justice context. The 120 percent approach to "meaningfully greater" can lead to identifying many BGs as potential environmental justice populations based on very small differences, and where the individuals do not constitute a community according to the CEQ definition noted above—"a group of individuals living in geographic proximity to one another." Therefore, this EIS uses this threshold to identify moderate potential for environmental justice populations, and other, higher thresholds to identify high potential for environmental justice populations.

For this PEIS, combinations of these thresholds define three degrees of likelihood that a BG contains a potential environmental justice population:

High Potential for Environmental Justice Populations:

- Greater than 50% combined minority population;
- Or greater than 20% of the total population living in poverty;
- Or greater than the reference percentage plus 20 percentage points for at least one minority population;
- Or greater than 120% of the reference percentage for combined minority population.

Moderate Potential for Environmental Justice Populations:

- Does not meet any of the above thresholds;
- And greater than 120% of the reference percentage for at least one minority population;
- Or greater than 120% of the reference percentage for individuals living with incomes below 200 percent of the federal poverty level.

Low Potential for Environmental Justice Populations:

- Does not meet any of the above thresholds.

The thresholds specific to the Moderate Potential category are much broader than those of the High Potential category. The Moderate Potential category casts a wide net – it was defined to err on the side of including an area as a potential environmental justice population. During FirstNet deployment, further analysis to verify the presence of specific, localized environmental justice populations would be particularly warranted for the Moderate Potential category.

This PEIS applies this methodology to all BGs in a state, using data from the Census Bureau's American Community Survey (ACS) 2009-2013 5-Year Estimates (U.S. Census Bureau, 2015b; U.S. Census Bureau, 2015c; U.S. Census Bureau, 2015d; U.S. Census Bureau, 2015e) and Census Bureau urban classification data (U.S. Census Bureau, 2010a; U.S. Census Bureau, 2010b). The ACS is the Census Bureau's flagship demographic estimates program for years between the decennial censuses. The 5-Year Estimates use sample data taken over a five-year period; this is the only nationally consistent source of the necessary data at the BG level.

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APPENDIX E – AIR QUALITY

Table E-1: National Ambient Air Quality Standards (NAAQS)

Pollutant	Averaging Time	Primary Standard[a]		Secondary Standard		Notes
		µg/m³	ppm	µg/m³	ppm	
CO	8-hour	10,000	9	-	-	Standard is not to be exceeded more than once per year
	1-hour	40,000	35	-	-	
Lead	3-month	0.15[b]	-	Same as Primary		Rolling average. Not to be exceeded
NO_2	1-hour	188	0.100	-	-	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Annual	100	0.053	Same as Primary		Annual Mean
PM_{10}	24-hour	150	-	-	-	Not to be exceeded more than once per year on average over 3 years
$PM_{2.5}$	Annual	12	-	15	-	Annual mean, averaged over 3 years
	24-hour	35	-	Same as Primary		98th percentile, averaged over 3 years
O_3	8-hour	147	0.075[c]	Same as Primary		Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
SO_2	1-hour	196	0.075[d]	-	-	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	3-hour	-	-	1,300	0.5	Not to be exceeded more than once per year

Source: (USEPA, 2014)

[a] The standard may be expressed both sets of units. A bank cell, containing a dash, indicates that there is no primary or secondary standard for the specific pollutant and averaging time.

[b] "Final Rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[c] Final Rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

[d] Final Rule signed June 2, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved."

Table E-2: Federally Regulated Hazardous Air Pollutants (HAPs)

POLLUTANT [a]	CAS#
Acetaldehyde	75070
Acetamide	60355
Acetonitrile	75058
Acetophenone	98862
2-Acetylaminofluorene	53963
Acrolein	107028
Acrylamide	79061
Acrylic acid	79107
Acrylonitrile	107131
Allyl chloride	107051
4-Aminobiphenyl	92671
Aniline	62533
o-Anisidine	90040
Asbestos	1332214
Benzene (including benzene from gasoline)	71432
Benzidine	92875
Benzotrichloride	98077
Benzyl chloride	100447
Biphenyl	92524
Bis(2-ethylhexyl)phthalate (DEHP)	117817
Bis(chloromethyl)ether	542881
Bromoform	75252
1,3-Butadiene	106990
Calcium cyanamide	156627
Caprolactam	105602
Captan	133062
Carbaryl	63252
Carbon disulfide	75150
Carbon tetrachloride	56235
Carbonyl sulfide	463581
Catechol	120809
Chloramben	133904
Chlordane	57749
Chlorine	7782505
Chloroacetic acid	79118
2-Chloroacetophenone	532274
Chlorobenzene	108907
Chlorobenzilate	510156

POLLUTANT [a]	CAS#
Chloroform	67663
Chloromethyl methyl ether	107302
Chloroprene	126998
Cresols/Cresylic acid (isomers and mixture)	1319773
o-Cresol	95487
m-Cresol	108394
p-Cresol	106445
Cumene	98828
2,4-D, salts and esters	94757
DDE	3547044
Diazomethane	334883
Dibenzofurans	132649
1,2-Dibromo-3-chloropropane	96128
Dibutylphthalate	84742
1,4-Dichlorobenzene(p)	106467
3,3-Dichlorobenzidene	91941
Dichloroethyl ether (Bis(2-chloroethyl)ether)	111444
1,3-Dichloropropene	542756
Dichlorvos	62737
Diethanolamine	111422
N,N-Diethyl aniline (N,N-Dimethylaniline)	121697
Diethyl sulfate	64675
3,3-Dimethoxybenzidine	119904
Dimethyl aminoazobenzene	60117
3,3'-Dimethyl benzidine	119937
Dimethyl carbamoyl chloride	79447
Dimethyl formamide	68122
1,1-Dimethyl hydrazine	57147
Dimethyl phthalate	131113
Dimethyl sulfate	77781
4,6-Dinitro-o-cresol, and salts	534521
2,4-Dinitrophenol	51285
2,4-Dinitrotoluene	121142
1,4-Dioxane (1,4-Diethyleneoxide)	123911
1,2-Diphenylhydrazine	122667
Epichlorohydrin (l-Chloro-2,3-epoxypropane)	106898
1,2-Epoxybutane	106887

POLLUTANT [a]	CAS#
Ethyl acrylate	140885
Ethyl benzene	100414
Ethyl carbamate (Urethane)	51796
Ethyl chloride (Chloroethane)	75003
Ethylene dibromide (Dibromoethane)	106934
Ethylene dichloride (1,2-Dichloroethane)	107062
Ethylene glycol	107211
Ethylene imine (Aziridine)	151564
Ethylene oxide	75218
Ethylene thiourea	96457
Ethylidene dichloride (1,1-Dichloroethane)	75343
Formaldehyde	50000
Heptachlor	76448
Hexachlorobenzene	118741
Hexachlorobutadiene	87683
Hexachlorocyclopentadiene	77474
Hexachloroethane	67721
Hexamethylene-1,6-diisocyanate	822060
Hexamethylphosphoramide	680319
Hexane	110543
Hydrazine	302012
Hydrochloric acid	7647010
Hydrogen fluoride (Hydrofluoric acid)	7664393
Hydrogen sulfide	7783064
Hydroquinone	123319
Isophorone	78591
Lindane (all isomers)	58899
Maleic anhydride	108316
Methanol	67561
Methoxychlor	72435
Methyl bromide (Bromomethane)	74839
Methyl chloride (Chloromethane)	74873
Methyl chloroform (1,1,1-Trichloroethane)	71556
Methyl ethyl ketone (2-Butanone)	78933
Methyl hydrazine	60344
Methyl iodide (Iodomethane)	74884
Methyl isobutyl ketone (Hexone)	108101
Methyl isocyanate	624839
Methyl methacrylate	80626

POLLUTANT [a]	CAS#
Methyl tert butyl ether	1634044
4,4-Methylene bis(2-chloroaniline)	101144
Methylene chloride (Dichloromethane)	75092
Methylene diphenyl diisocyanate (MDI)	101688
4,4'¬-Methylenedianiline	101779
Naphthalene	91203
Nitrobenzene	98953
4-Nitrobiphenyl	92933
4-Nitrophenol	100027
2-Nitropropane	79469
N-Nitroso-N-methylurea	684935
N-Nitrosodimethylamine	62759
N-Nitrosomorpholine	59892
Parathion	56382
Pentachloronitrobenzene (Quintobenzene)	82688
Pentachlorophenol	87865
Phenol	108952
p-Phenylenediamine	106503
Phosgene	75445
Phosphine	7803512
Phosphorus	7723140
Phthalic anhydride	85449
Polychlorinated biphenyls (Aroclors)	1336363
1,3-Propane sultone	1120714
beta-Propiolactone	57578
Propionaldehyde	123386
Propoxur (Baygon)	114261
Propylene dichloride (1,2-Dichloropropane)	78875
Propylene oxide	75569
1,2-Propylenimine (2-Methyl aziridine)	75558
Quinoline	91225
Quinone	106514
Styrene	100425
Styrene oxide	96093
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016
1,1,2,2-Tetrachloroethane	79345
Tetrachloroethylene (Perchloroethylene)	127184
Titanium tetrachloride	7550450
Toluene	108883

POLLUTANT [a]	CAS#
2,4-Toluene diamine	95807
2,4-Toluene diisocyanate	584849
o-Toluidine	95534
Toxaphene (chlorinated camphene)	8001352
1,2,4-Trichlorobenzene	120821
1,1,2-Trichloroethane	79005
Trichloroethylene	79016
2,4,5-Trichlorophenol	95954
2,4,6-Trichlorophenol	88062
Triethylamine	121448
Trifluralin	1582098
2,2,4-Trimethylpentane	540841
Vinyl acetate	108054
Vinyl bromide	593602
Vinyl chloride	75014
Vinylidene chloride (1,1-Dichloroethylene)	75354
Xylenes (isomers and mixture)	1330207
o-Xylenes	95476
m-Xylenes	108383
p-Xylenes	106423
Antimony Compounds	-
Arsenic Compounds (inorganic including arsine)	-
Beryllium Compounds	-
Cadmium Compounds	-
Chromium Compounds	-
Cobalt Compounds	-
Coke Oven Emissions	-
Cyanide Compounds[b]	-
Glycol ethers[c]	-
Lead Compounds	-
Manganese Compounds	-
Mercury Compounds	-
Fine mineral fibers[d]	-
Nickel Compounds	-
Polycylic Organic Matter[e]	-
Radionuclides (including radon)[f]	-
Selenium Compounds	-

Source: (USEPA, 2013)

[a] For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.

[b] X'CN where X = H' or any other group where a formal dissociation may occur. For example KCN or $Ca(CN)_2$

[c] Includes mono- and di- ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH_2CH_2)n –OR' where:
n = 1, 2, or 3;
R = alkyl C7 or less; or
R = phenyl or alkyl substituted phenyl;
R'= H or alkyl C7 or less; or
OR' consists of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.

[d] Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

[e] Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 º C.

[f] A type of atom which spontaneously undergoes radioactive decay.

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APPENDIX F – COMMENT RESPONSE

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
South	10/20/2016	email	Andrew Gourd	Citizen Potowatomi Nation	DPEIS Review	I feel that it is important to make a complaint for myself, and probably other THPO's. We are very busy offices, and often have an entire month planned out ahead of time. Hence the need for a 30 comment period on most projects. Your letter arrived at my desk today, was dated from October 11, and was received by our mail department on October 17. The meeting for our state is less than 20 days away. Some of meetings were scheduled only 2 weeks after your intial letter. I will try to make it to your meeting in OKC, since it is close to our offices. However I know that many tribes in this state, of which there are over 30, may not be able to schedule so close and an event and drive all the way to the OKC. Thank you for your time	Thank you for your email. We appreciate from experience how busy various THPOs are and apologize for the timing of everything in light of that. FirstNet welcomes comments from tribes at any point during the process.
South	10/21/2016	email	Michael Robotham	NRCS	DPEIS Review	I have attached some correspondence related to NRCS concerns about the use of STATSGO2 vs SSURGO soils data in these PEIS documents for your information. STATSGO2 is appropriate, although not ideal, at this broad level of analysis. However, for any site-specific decisions related to the implementation of the network (e.g. selection of locations for tower construction), the SSURGO information must be used when it is available (and that is nearly 80% of CONUS and all of the Pacific Islands). Another issue that has come up in our internal agency discussions is the need for FirstNet to be aware of land use easements that are held by NRCS (and I believe by other agencies – but we are focused on ours). NRCS holds some very large acreage easements, primarily focused on wildlife habitat. These are mainly located in the Western US, but	Information related to NRCS easements has been included in the Final PEIS within the Land Use, Airspace, and Recreation sections of each state/territory chapter. In addition, a BMP has been added to Chapter XX, BMPs and Mitigation Measures, indicating that reasonable efforts would be taken to avoid or minimize construction activities in areas covered by existing incompatible easements.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						easements have been purchased nationwide. Easement conditions often severely restrict potential management activities including, but not limited to, construction activities. Easements can be amended, but this is typically a very long process and, depending on the particular species of concern, proposed FirstNet activities may not be compatible with the goals of the particular easement. To address this issue, we suggest that language be included in the Draft PEIS recognizing that FirstNet is aware of this as a potential issue, and that all reasonable efforts will be taken to avoid construction activities in areas covered by existing easements. Thank you for the opportunity to comment on these PEIS documents and please do not hesitate to contact me if you have any questions or need additional information.	
South	11/7/2016	email	Joshua Marceaux	USFWS - Southwest Louisiana National Wildlife Refuge Complex	DPEIS Review	Per our recent telephone conversation regarding the DPEIS "FirstNet", please provide confirmation that consultation regarding potential project related impacts to threatened/endangered species and/or their habitat will take place when project activity locations are known in Louisiana (prior to any habitat alteration taking place). That consultation should be addressed to Mr. Joseph Ranson, Field Supervisor, Louisiana Ecological Services Office, 646 Cajundome Blvd, Suite 400 Lafayette, LA 70506. Thank you.	Thank you for your email (attached below) and contact information, as well as that of Mr. Ranson. In response to your question, FirstNet actions related to the deployment of the nationwide public safety broadband network, including those occurring in Louisiana, will comply with the applicable provisions of the Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.).
South	11/9/2016	Letter	Theodore E. Villicana	Comanche Nation	Tribal lands	In response to your request, the above reference project has been reviewed by staff of this office to identify areas that may potentially contain prehistoric or historic archeological materials. The location of your project has been cross referenced with the	Thank you for your review and comments. FirstNet is committed to working with tribes. FirstNet does not yet have proposed network

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Comanche Nation site files, where an indication of "No Properties" have been identified. (IAW 36 CFR 800.4(d)(1)). Please contact this office at (580) 595-9960/9618 if you require additional information on this project. This review is performed in order to identify and preserve the Comanche Nation and State cultural heritage, in conjunction with the State Historic Preservation Office.	design, but will consult with the Comanche Nation once specific sites are identified that would potentially be of interest to the tribe. FirstNet anticipates doing this through the use of the Federal Communications Commission's (FCC) Tower Construction Notification System (TCNS). Once your tribe receives a notification through TCNS, please ensure that your response includes any requests for monitoring or other concerns.
South	11/10/2016	comment card	Bob Sheaks	public	Copy of DPEIS	I would like a copy of the Texas chapter.	Thank you for your interest. A copy of the South DPEIS was delivered.
South	11/10/2016	comment card	Karla Jurrens	TX DPS	Tribal Interest	The three tribes in TX would greatly appreciate either a webinar or visits from the Environmental Team.	Thank you for the request. FirstNet held a conference call for these tribes in December 2016 to follow up on this request.
South	12/5/2016	regulations.gov	Bryant Celestine	Alabama-Coushatta Tribe of Texas	DPEIS Review	There are some considerations to be fulfilled for this statement: The tribal lands identified in the statement are not exclusive to Eastern Texas, only the Alabama-Coushatta. The Kickapoo are South Texas while the Isleta are West Texas. Since this is a PEIS, I assume the National Environmental Policy Act is involved. If so, that needs to be stipulated in the regulations section. Importantly, NEPA has inclusive language of Section 106 of the NHPA; unfortunately, interpretation often leads to adhering to Categorical Exclusions within the regulations. The law specifically states Categorical Exclusions must be reviewed and approved by federally recognized tribes	Thank you for your review and comments. FirstNet is committed to working closely with tribes and to full compliance with the National Environmental Policy Act and the National Historic Preservation Act, both of which are discussed in Chapter 1 of the South PEIS and provide the regulatory foundation for this analysis. FirstNet will consult with the

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						before such can be implemented. I make mention of this to avoid any attempt to CAT EX any undertaking our Office has not approved. This is not an effort to delay any undertaking for public safety but to ensure agency obligations for regulatory compliance. Under the NHPA, tribes have the opportunity to assume the SHPO responsibilities over Reservation lands (101d responsibilities as THPO). For any tribes that have not assume the 101(d) responsibilities, the SHPO still has authority to provide input and review on undertakings occurring on Reservation (trust) lands. The SHPO may invoke the State Antiquities law at their own discretion. (We have spoken with the THC regarding undertakings occurring on Alabama-Coushatta trust lands, including the environmental review process the Tribe adheres to wherein our Office does review every project in consideration of known sites by oral history and documented maps along with pedestrian survey. We do anticipate assuming the THPO status on trust lands, wherein the THC has vocally supported this effort, with the guidance of a professional investigator in compliance of the Secretary of the DOI's requirements. The THC has vocally indicated our process fulfills their immediate concerns for such undertakings on trust lands.) The federally recognized (FR) tribes of Texas segment is accurate in the designation of the three tribes. However, the regulations previously mentioned in the context opens the door for all FR tribes with ancestral interests in the state of Texas. I believe there are over 20 tribes that claim some portion of the state. Some of those are included in the map provided though the text indicates they are not FR. That needs to be corrected since they are. Further, this PEIS will require due diligence of consultation to all those tribes as their tribal interests may parallel or intersect those of the three FR tribes. Thank you,	Alabama-Coushatta Tribe of Texas once specific sites are identified that would potentially be of interest to the tribe. FirstNet anticipates doing this through the use of the Federal Communications Commission's (FCC) Tower Construction Notification System (TCNS). Once your tribe receives a notification through TCNS, please ensure that your response includes any requests for monitoring or other concerns. WIth regard to the map identified, FirstNet will revise the document for clarity.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Bryant J. Celestine Historic Preservation Officer Alabama-Coushatta Tribe of Texas	
South	12/6/2016	regulations.gov	Anonymous	Ponca Tribe of Indians of Oklahoma	Tribal lands	I could not find specifics to locations. Was wondering if locations are located near Ponca Tribal Lands in Oklahoma.	Thank you for your review and comments. FirstNet is committed to working with tribes. FirstNet will consult with the Ponca Tribe of Indians of Oklahoma once specific sites are identified that would potentially be of interest to the tribe. FirstNet anticipates doing this through the use of the Federal Communications Commission's (FCC) Tower Construction Notification System (TCNS). Once your tribe receives a notification through TCNS, please ensure that your response includes any requests for monitoring or other concerns.
South	12/8/2016	letter	Robert Tomiak	U.S. Environmental Protection Agency	DPEIS Review	In accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality regulations for implementing NEPA, the U.S. Environmental Protection Agency (EPA) has completed its review of the First Responder Network Authority (FirstNet), draft Programmatic Environmental Impact Statement (PEIS). The draft PEIS analyzes the impacts of the construction and operation of a nationwide public safety broadband network (NPSBN) in the western United States. The NPSBN will address a critical national infrastructure need for a nationwide network to allow	Thank you for your review and comments. FirstNet has reviewed USEPA's comments on the other regional PEIS' and has revised content to follow the CEQ 2016 guidance per your comments.

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						law enforcement personnel, fire fighters, emergency medical service professionals, and other public safety entities to communicate across agencies and jurisdictions. The draft PEIS is the last in a series that covers five geographic regions across the U.S. This draft PEIS covers the southern United States and includes the states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee and Texas. The draft PEIS analyzed three alternatives: 1) Preferred Alternative, 2) Deployable Technologies Only Alternative, and 3) No Action Alternative. FirstNet selected the Preferred Alternative. Under the Preferred Alternative, FirstNet would construct a nationwide broadband Long Term Evolution (LTE) network using a combination of wired, wireless, deployable, and satellite technologies. This may include, but is not limited to: colocation of network equipment and new infrastructure. Based on our review, EPA rates the Preferred Alternative an LO. The "LO" rating signifies that the draft PEIS review did not identify any potential environmental impacts requiring substantive changes to the Preferred Alternative. Please refer to our previous letters dated November 15, 2016 and October 11, 2016 in which we offered comments relevant for inclusion in this PEIS. The EPA Rating System Criteria is located at http:/www.epa.gov/compliance/nepa/comments/ratings.html. We appreciate the opportunity to review the draft PEIS and look forward to reviewing the final PEIS.	

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						The staff contact for the review is Arthur Totten and he can be reached at (202) 564-7164.	
South	12/9/2016	regulations.gov	Lisa Treichel	USDOI	DPEIS review	The Department of the Interior (Department) has reviewed the DPEIS for the South Region of the Nationwide Public Safety Broadband Network and Notice of Public Meetings, U.S. Department of Commerce, National Telecommunications and Information Administration, First Responder Network (FirstNet) Authority. The Proposed Action may impact federally-listed species and migratory birds. Because the DPEIS does not include specific locations or impacts, it is not possible to assess those specific impacts at this time. The Department recommends that FirstNet consult with the U.S. Fish and Wildlife Service (USFWS) when planning specific clearing and construction projects. The USFWS offer the following comments on the DPEIS related to the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 ef seq.) and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-7 12). General Comments In Chapter 16, pages 16-20 of the DPEIS, it is stated that FirstNet will conduct early consultation for threatened and endangered species and migratory birds with the USFWS, among other agencies. The Department encourages FirstNet to coordinate and provide an opportunity for the USFWS to review and comment on FirstNet's determinations, once site specific information is available on activities such as land/vegetation clearing and excavation to ensure compliance with the ESA. The Department emphasizes that USFWS Interim Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS 2013 , at https://www.fws.gov/migratorybirds/pdf/management	Thank you for your review and comments. FirstNet and/or its Network Partner will engage in consultation with the USFWS as required, and will adhere to the results of any consultation. The USFWS voluntary guidelines arereferred to throughout the document and discussed in Chapter 16; they would be implemented as practicable and feasible.

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						iusfwscomm unicationtowerguidance.pdf recommend unguyed and unlit towers	
South	12/9/2016	regulations.gov	Michaela Noble	USDOI	DPEIS Review	The Department of the Interior (Department) has reviewed the DPEIS for the South Region of the Nationwide Public Safety Broadband Network and Notice of Public Meetings, U.S. Department of Commerce, National Telecommunications and Information Administration, First Responder Network (FirstNet) Authority. The Proposed Action may impact federally-listed species and migratory birds. Because the DPEIS does not include specific locations or impacts, it is not possible to assess those specific impacts at this time. The Department recommends that FirstNet consult with the U.S. Fish and Wildlife Service (USFWS) when planning specific clearing and construction projects. The USFWS offer the following comments on the DPEIS related to the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 ef seq.) and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-7 12). General Comments In Chapter 16, pages 16-20 of the DPEIS, it is stated that FirstNet will conduct early consultation for threatened and endangered species and migratory birds with the USFWS, among other agencies. The Department encourages FirstNet to coordinate and provide an opportunity for the USFWS to review and comment on FirstNet's determinations, once site specific information is available on activities such as land/vegetation clearing and excavation to ensure compliance with the ESA. The Department emphasizes that USFWS Interim Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS 2013 , at https://www.fws.gov/migratorybirds/pdf/management iusfwscomm unicationtowerguidance.pdf recommend	Thank you for your review and comments. FirstNet and/or its Network Partner will engage in consultation with the USFWS as required, and will adhere to the results of any consultation. The USFWS voluntary guidelines are referred to throughout the document as well as in Chapter 16; FirstNet and/or its network partner will implement the guidelines as practicable and feasible. Furthermore, the document has been updated to include a recommendation to implement updated FAA lighting requirements to minimize impacts to birds.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						unguyed and unlit towers available on activities such as land/vegetation clearing and excavation to ensure compliance with the ESA. The Department emphasizes that USFWS Interim Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS 2013, at https://www.fws.gov/migratorybirds/pdf/management/usfwscommunicationtowerguidance.pdf) recommend unguyed and unlit towers when practicable to reduce bird collisions, injuries, and mortalities. The recent Department of Transportation, Federal Aviation Administration (FAA) modifications to obstruction marking and lighting requirements include new configurations that feature flashing lights and which are likely to result in a significant decrease in bird fatalities (see FAA Advisory Circular, December 4, 2015, at http://www.faa.gov/docurnentLibrary/media/ Advisory Circular/ AC 70 7460-1 L .pdf).	
South	12/9/2016	regulations.gov	Michaela Noble	USDOI	DPEIS Review	Specific Comments The USFWS Kentucky Field Office (KFO) has three updates to the list of federally-listed species provided in the DPEIS. The Kentucky arrow dater (Etheostoma sagitta spilotum) and the white fringeless orchid (Platanthera integrilabia) are listed as "proposed" in the DPEIS. These two species have been recently listed under the ESA: the Kentucky arrow darter as "threatened" on November 4, 2016, (81 FR 68963) and the white fringeless orchid as "threatened" on October 13, 2016, (81 FR 62826). The white-haired goldenrod (Solidago albopilosa) is listed as "threatened" in the DPEIS; this species was delisted on October 12, 2016, (81 FR 70043). The KFO believes that the "typical Best Management Practices (BMPs) and mitigation measures" in Table	Thank you for your review and comments. FirstNet has updated the species content in Section 7.1.6.6 to reflect USFWS's recent listing that were updated after publication of the PEIS. FirstNet will review Table 7.2.6-2 per comments.

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						ES5-6, section 7 .2.6.6, and chapter 16 of the DPEIS will help to minimize impacts to federally-listed species. Table 7.2.6-2 describes the "impact significance rating criteria" that would be used to evaluate effects to listed species resulting from the range of actions that could be covered under this programmatic evaluation. The first row of that table, shown below, organizes types of effects on listed species by impact level. The Department has identified the following places in which the information is not consistent with the ESA: • In the ESA, "harm" is defined as "an act which actually kills or injures wildlife" and is included in the definition of "take." Therefore, the appropriate determination for all actions that result in injury or mortality of a listed species would be "may affect, likely to adversely affect." • The statement "excludes permitted take" in the "may affect, likely to adversely affect" column is not correct. "May affect, likely to adversely affect" is still the appropriate determination for actions that result take of a listed species, even if the take is not prohibited (e.g. permitted).	
South	12/9/2016	regulations.gov	Michaela Noble	USDOI	DPEIS Review	The USFWS KFO has the following comments regarding the DPEIS's evaluation of potential effects of actions to federally-listed species: • Beginning on page 7-334, the DPEIS lists "activities likely to have no effect" on threatened and endangered species or their habitat. One of the activities listed is "use of existing conduit - new buried fiber optic plant" that involves installing new fiber optic cable in existing conduit and would only require disturbance at entry and exit points of previously disturbed areas. The DPEIS states that "although threatened and endangered species and	FirstNet understands your concerns related to the use of existing conduit, but we believe that the disturbance at any entry and exit points (i.e., an individual walking to the location) would be highly unlikely to have any effect on listed species. However, should any research indicate that such species may be present, FirstNet and/or its

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						their habitat could be impacted, it is anticipated that effects to threatened and endangered species would be temporary, infrequent, and likely not conducted in locations designated as vital or critical for any period." Although concurrence is not required if a Federal action agency determines that an action will have no effect on listed species or critical habitat, we believe that, considering the evaluation provided for these impacts, a "may affect" determination may be the more appropriate determination. Impacts that are temporary, infrequent, or not in locations designated as vital or critical may still result in adverse effects. • Beginning on page 7-334, the DPEIS lists "activities with the potential to affect listed species" and, in the final summary paragraph, concludes that "potential impacts may affect, but are not likely [to] adversely affect protected species." These activities include land/vegetation clearing and excavation and trenching. This section refers to BMPs and mitigation measures that would be implemented to minimize potential impacts during these activities and concludes that these activities are not likely to adversely affect listed species. For some actions, the use of these measures may limit the effect to listed species to a level for which a "may affect, not likely to adversely affect" determination would be appropriate. However, ·site-specific evaluations and/or a comprehensive programmatic evaluation would be necessary to support that determination. Consultation with the USFWS is required under section 7 of the ESA for all actions that may affect listed species. If it is determined that a "may affect, likely to adversely affect" is appropriate for a specific action or actions, then formal consultation would need to be initiated. The Department appreciates the opportunity to participate in the environmental review of the	Network Partner will contact USFWS for guidance. FirstNet and/or its Network Partner would engage in consultation with the USFWS for any site specific activities that had the potential to affect listed species, and would adhere to the results of that consultation, in accordance with the law. FirstNet is still developing its site specific review process. Once that process has been defined, FirstNet will develop a supplemental programmatic environmental impact statement.

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						Proposed Action. If you have any questions please contact Christine Willis, USFWS, Energy Coordinator, Division of Environmental Review, Ecological Services, Southeast Regional Office, at Christine Willis@fws.gov.	
South	12/12/2016	pdf letter	Chuck L. Hayes	State of New Mexico Department of Game & Fish	DPEIS Review	Re: FirstNet Nationwide Public Safety Broadband Network Draft Programmatic EIS; NMDGF No. 17374 Dear Ms. Walker: The New Mexico Department of Game and Fish (Department) has reviewed Chapter 10 New Mexico, and Chapter 16 BMPs and Mitigation Measures, of the Draft Programmatic Environmental Impact Statement (DPEIS). Chapter 10 contains a vast amount of information that in general accurately defines potential project impacts on fish and wildlife and establishes accurate baseline conditions for biological resources in New Mexico.	Thank you for your review and comments.
South	12/12/2016	pdf letter	Chuck L. Hayes	State of New Mexico Department of Game & Fish	DPEIS Review	Regarding bird species documented in New Mexico, page 10-99 states: "Examples of bird species that are considered to have established, self-sustaining, wild populations in New Mexico are listed below (Audubon New Mexico, 2015a)". The list contains many bird species that are rare or vagrants to the state, such as black-bellied and fulvous whistling ducks. We recommend that the narrative be revised to state "Bird species that have been documented occurring in New Mexico".	Chapter 10 has been updated to reflect the suggested revision.
South	12/12/2016	pdf letter	Chuck L. Hayes	State of New Mexico Department of Game & Fish	DPEIS Review	The Soils BMP on page 16-3, 5th bullet, should be revised to state: "Revegetate disturbed areas with plants native to the local area as progressively and quickly as practicable to achieve stabilization". Other revegetation BMPs should also be revised to require revegetation with plants native to the local area.	Chapter 16 has been updated to reflect the suggested revision.
South	12/12/2016	pdf letter	Chuck L. Hayes	State of New Mexico	DPEIS Review	Of the 867 species of vertebrates known to occur in New Mexico, approximately 479 (55%) rely wholly,	Thank you for your review and comments. The BMPs

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				Department of Game & Fish		or in part, on aquatic, wetland or riparian habitat for their survival (NMDGF 2006). Surface water comprises only 0.2 percent (141,440 acres) of the surface area of New Mexico (USGS 1970). Wetlands and riparian areas comprise another 0.6 percent (481,900 acres) (Dahl 1990). Migratory birds that are protected from take by the Migratory Bird Treaty Act and New Mexico statute are concentrated around aquatic, wetland and riparian habitats, especially during nesting and migration periods. Communication towers are known to kill millions of migratory birds annually from collisions with guy wires and towers (NMDGF Guidelines for Mitigating Bird Mortality from Communication Towers, July 2001; http://www.wildlife.state.nm.us/download/conservation/habitat-handbook/project-guidelines/Communication-Tower-Project-Guidelines-USFWS.pdf). Therefore, BMPs should be developed for the water resources and wetlands sections of Chapter 16 that emphasize avoiding aquatic, wetland and riparian habitat in New Mexico whenever possible, especially for tower construction projects. Playa lakes are important aquatic migratory bird breeding and migration stopover habitat, especially for waterfowl, including cranes and geese, and shorebirds. The Playa Lakes Joint Venture developed the Playa Decision Support System (Playa DSS), a GIS-based tool designed to maximize the conservation of playas in eastern New Mexico and surrounding states by providing guidance for land-use activities. Projects planned for eastern New Mexico should consult the Playa DSS (http://pljv.org/for-habitat-partners/maps-and-data/playa-decision-support-system/) to guide placement of towers, overhead transmission lines and other infrastructure	chapter recommends the avoidance of wetland and riparian habitat as practicable and feasible, and will be updated to include additional suggestions. FirstNet is still developing its site-specific review process. Once the process, including roles and responsibilities, has been determined, FirstNet will release a Supplemental Programmatic Environmental Impact Statement.

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						away from playas, and a BMP should be developed requiring a buffer of 0.25 miles from playas.	
South	12/12/2016	pdf letter	Chuck L. Hayes	State of New Mexico Department of Game & Fish	DPEIS Review	The first bullet on page 16-12 should be revised to read: "Engage in early consultation with appropriate agencies and stakeholders, including but not limited to the U.S. Fish and Wildlife Service (USFWS) and state wildlife and natural resource agencies". Page 16-13, 5th bullet should be revised to state: "Engage in early consultation with appropriate agencies and stakeholders as necessary, including but not limited to USFWS, National Marine Fisheries Service (NMFS), and other relevant federal and state wildlife and natural resource agencies". We appreciate the opportunity to comment on this project. Should you have any questions regarding our comments, please contact Mark Watson, Terrestrial Habitat Specialist, at (505) 476-8115, or mark.watson@state.nm.us.	Thank you for your comments, FirstNet and/or its Network Partners will engage with federal and state natural resource and wildlife management agencies, as appropriate.
South	12/12/2016	pdf letter	Chuck L. Hayes	State of New Mexico Department of Game & Fish	DPEIS Review	The first bullet on page 16-12 should be revised to read: "Engage in early consultation with appropriate agencies and stakeholders, including but not limited to the U.S. Fish and Wildlife Service (USFWS) and state wildlife and natural resource agencies". Page 16-13, 5th bullet should be revised to state: "Engage in early consultation with appropriate agencies and stakeholders as necessary, including but not limited to USFWS, National Marine Fisheries Service (NMFS), and other relevant federal and state wildlife and natural resource agencies". We appreciate the opportunity to comment on this project. Should you have any questions regarding our comments, please contact Mark Watson, Terrestrial Habitat Specialist, at (505) 476-8115, or mark.watson@state.nm.us.	Thank you for your comments, FirstNet and/or its Network Partners will engage with federal and state natural resource and wildlife management agencies, as appropriate.
South	12/13/2016	pdf letter/ Journal Article	Rebecca Smith		DPEIS Review	References: a. Your Freedom of Information Act (FOIA) request dated May 25, 2006, to the Depaitment of the	Thank you for your review and comments. FirstNet has revised the section on RF

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						Army, Freedom of Information/Privacy Act Division (DA FOIA!PA DIV), for all documents pertaining to the microwave aucLitory effect, microwave hearing effect, Frey effect, artificiaJ telepathy, and/or any device/weapon which uses and/or causes such effect; and any covert or undisclosed use of hypnosis. On September 5, 2006, the DA FOfA/PA DIV referred a copy of your request to this office. Your request was received on September 11, 2006. b.Our letter of September 13, 2006, informing you of the search for records at another element of our command and were unable to comply with the 20-day statutory time limit in processing your request. As noted in our letter, the search has been completed with another clement of this command and the record has been returned to this office for our review and direct response to you. We have completed a mandatory declassification review in accordance with Executive Order (EO) 12958, as amended. As a result of this review, it has been determined that the Army information no longer warrants secw·ity classification protection and is releasable to you. A copy of the record is enclosed for your use. Fees for processing your request are waived . If you have any questions concerning this action, please feel free to contact this office at (301) 677-2308. Refer to case #614F-06. Journal Article: Bioeffects of Selected Nonlethal Weapons(fn 1) Journal Article: Biological Effects of Electromagnetic Radiation (Radiowaves and Microwaves) Eurasian Communist Countries (U) [Defense Intelligence Agency]	emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/15/2016	email	Michelle Illiatovitch		DPEIS Review	Dear Ms. Walker, I am a 70 year old woman who's health has been	Thank you for your review and comments. FirstNet has

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						compromised by the increasing amount of RF due to wireless implements. M world has become smaller as it is impossible to do many things I would have done such as going to the library, shopping in stores or having a coffee with a friend at a coffee shop to name a few. Not earth shattering you might say, but my world has diminished nonetheless. I also watched the health of my daughter, who is a young woman,26 years, deteriorate dramatically when living in a building with cell phone towers on top. I have read scientific reports about fire fighters contracting brain cancer due to the cell phone towers on their firehall. The studies are numerous and even if for some strange reason you do not find it conclusive, it should be enough to at least give pause, be cautious and err on the side of safety. I urge you to consider the science and support better regulations regarding cell use and first responders. Sincerely, MIchelle Illiatovitch	revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/15/2016	email	Rebecca Smith		DPEIS Review	Please see attached document file. I am a descendant of an atomic US veteran, former US Army Reserve Combat Electrician and for many more years was a US Navy air traffic controller, and then an FAA air traffic controller, I assure you I am quite sane and recently completed four graduate degrees in aeronautical science including Space Studies, I am an electromagnetic hypersensitive female, diagnosed at age 55 by functional MRI imaging. This condition is a global problem.I have quite a voluminous assortment of supportive documents. Attached is a most recent article written for the engineering sector. Sincerely, Rebecca Smith	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Attachments: Department of the Army, Bioeffects of Selected Nonlethal Weapons(fn1) Biological Effects of Electromagnetic Radiation (Radiowaves and Microwaves) Eurasian Communist Countries (U) Journal Article: A New Paradigm in EMF Science (Jeromy Johnson)	
South	12/15/2016	email	Rebecca Smith		DPEIS Review	Please see attached document file. I am a descendant of an atomic US veteran, former US Army Reserve Combat Electrician and for many more years was a US Navy air traffic controller, and then an FAA air traffic controller, I assure you I am quite sane and recently completed four graduate degrees in aeronautical science including Space Studies, I am an electromagnetic hypersensitive female, diagnosed at age 55 by functional MRI imaging. This condition is a global problem.I have quite a voluminous assortment of supportive documents. Attached is a most recent article written for the engineering sector. Sincerely, Rebecca Smith Journal Article: A New Paradigm in EMF Science (Jeromy Johnson)	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/15/2016	email (Attachment 1 "FirstNet Rebuttal") Page 1	Tara Schell		DPEIS Review	I would like to re-butt your arguments based on personal experience and studies regarding your FirstNet Draft Environmental Impact Statements. I also am requesting that Congress eliminate your provision of wireless broadband internet from FirstNet's mission and: Delay implementation of wireless first responder's component until they design as system that provides good interoperable first responder communication while minimizing radiofrequency emissions from antennas and first responder's communicators -Cancer findings with radios in first responders	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						-Cancer findings from cellphone radiation from NTP - http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/ Thus, communicators should be able to contact each other directly, not require an outside antenna (certain types of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed. There is direct evidence of human and environmental harm with thousands of modern studies that trump the old ones. Please read through the list of critiques below for a list of some of the most problematic points and omissions. We (and the Department of Interior) were successful in getting FirstNet to complete a Programatic Environmental Impact Statement (PEIS). The Central Region document is available at the following site: https://www.regulations.gov/document?D=FIRSTNET-2016-0003-0001 The East Region https://www.regulations.gov/document?D=FIRSTNET-2016-0002-0001 The South region is available for review and comment at the following link: https://www.regulations.gov/document?D=FIRSTNET-2016-0005-0001 West Region https://www.regulations.gov/document?D=FIRSTNET-2016-0004-0001 or	

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						https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&D=FIRSTNET-2016-0004 The documents are huge, however the RF portion is tiny. It is not dealt with throughout the documents. It seems to be in 2.4 which I believe means Chapter 2 section 4 for the two PEIS documents that I was able to obtain. Here are my critiques: RF health risks to workers, the population, and the environment are not addressed throughout the document - they are isolated to the RF section and quickly dismissed. "The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer" (http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18) "Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions" (http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf)	
South	12/15/2016	email (Attachment 1 "FirstNet Rebuttal") Page 2	Tara Schell		DPEIS Review	"How does long term exposure to base stations and mobile phones affect human hormone profiles?," Eskander et al. (http://www.sciencedirect.com/science/article/pii/S0009912011027330) FirstNet wireless technology will be LTE 4G or	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed,

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						higher. Toxicology studies should be done comparing 4G and other communications protocols so that first responders and the population are exposed to the safest. FirstNet has created to allow first responders to communicate easily AND TO PROVIDE WIRELESS BROADBAND NATIONWIDE (2-8). Contrary to their statement FCC regulations do not protect from "any potential effects," as this letter from Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, regarding the limitations and purpose of the FCC exposure standards notes (http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf) This very credible evidence is unmentioned and ignored. FCC regulations are poorly enforced. (An issue which is completely ignored in the PEIS.) Rampant violations are documented by the Wall Street Journal and EMR Policy Institute. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (http://www.marketwire.com/press-release/-1770139.htm). A Wall Street Journal investigation (http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015. A fully elucidated mechanism should not be required to take action to protect public health when detrimental effects are found. Serious biological	independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						effects are acknowledged and then ignored on page 2-20. The two mechanisms that are extremely plausible and well-supported in the literature are completely ignored: Oxidation – 1. Yakymenko, I., Tsybulin, O., Sidorik, E., et al. (2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. Electromagn Biol Med. Jul;7:1-16. http://www.ncbi.nlm.nih.gov/pubmed/26151230# Ca 2+ channels 1. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard Recent Res Devel Mol Cell Biol 7. 2. Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. J Chem Neuroanat DOI: 10.1016/j.jchemneu.2015.08.001. http://dx.doi.org/10.1016/j.jchemneu.2015.08.001 3. Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. The PEIS uses outdated documents to excuse inaction. Contrary to their assertion, FCC limits do not protect against adverse effects, even the DOI noted “the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable	

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						today" (http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf) The opening of the FCC docket to re-evaluate limits is acknowledged, but then ignored. The logical step of delaying implementation of the wireless component until that is completed is not even mentioned. The National Toxicology Program findings are not even mentioned.	
South	12/15/2016	email (Attachment 1 "FirstNet Rebuttal") Page 3	Tara Schell		DPEIS Review	Their exposure calculations are based on only one antenna and work out to 477uW/m2, which is over the level shown to cause biological effects (http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf see graph at end). Most towers or building antenna sites have more than one antenna radiating in any given direction, plus signals come from other nearby sites, and the ground infrastructure such as cellphones, tablets etc. So levels at ground level are likely to be far higher than that and levels in apartments or homes which get a direct hit from neighboring buildings could be far higher depending on distance. Several IARC panelists have made public statements that the evidence now shows that radiofrequency radiation should be classified as either a class 2A or class 1 human carcinogen. The recent (ignored) National Toxicology Program findings support this. This should cause the wireless portion to be stopped and FirstNet should explain why to Congress, but no mention is made and therefore no such action is recommended.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						They refuse to take action to protect birds in spite of lab and epidemiological evidence that support each other in finding hard because it requires "interpretation and extrapolation."(2-20) Doesn't it always? They hardly touch on tree damage and totally ignore the following tree and plant studies: • Radiofrequency radiation injures trees around mobile phone base stations: https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations • Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations https://www.hindawi.com/journals/ijfr/2010/836278/ • Review: Weak radiofrequency radiation exposure from mobile phone radiation on plants: http://www.ncbi.nlm.nih.gov/pubmed/27650031?dopt=Abstract • Tree damage in the vicinity of mobile phone base stations: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf	
South	12/15/2016	email (Attachment 1 "FirstNet Rebuttal") Page 3	Tara Schell		DPEIS Review	• The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf • Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. -IMPORTANT MECHANISTIC DISCUSSION	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						On 2-20 the PEIS acknowledges "A number of other studies generally touch upon the nature of RF exposure and the disruption of biological processes that are fundamental to plant and animal growth and health, including but not limited to behavior, DNA damage, immune deficiencies, reproductive system effects, hormone dysregulation, degraded cognition and sleep, and desynchronization of neural activity (BioInitiative Working Group, 2012) (Balmori, A., 2005)," but then no protective action is being taken because "The common practice for NEPA documents related to cellular towers is to cite FCC standards and point to the fact that they would be built and operated according to allowable FCC RF emission limits. Some NEPA documents that have more directly addressed the RF emissions potential largely point to the existing literature and suggest that although there is evidence that RF emissions could potentially affect some species, the evidence is insufficient to support a finding of adverse impacts on these species due to RF emissions (Ballistic Missile Defense Organization, 2000) (FCC, 2012)." This approach was not allowable by the courts in other situations. Especially since the inadequacy of the FCC RF limits is now acknowledged by both the DOI and the EPA. In addition, numerous studies have added to the knowledge about the hazard that RF poses to human health since both 2000 and 2012, including the NTP study which has found that RF is carcinogenic and breaks DNA. I am fully disabled from wireless damage and exposure. Wireless has also caused a hypersensitivity in me to all types of EMFs.	
South	12/15/2016	email (Attachment	Tara Schell		DPEIS Review	It is against the Nuremberg Treaty to experiment on us without informed consent and it is unconstitutional	Thank you for your review and comments. FirstNet has

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
		1 "FirstNet Rebuttal") Page 4				to take away basic human rights and freedoms from me. I can not work, drive, access most public places or medical facilities, and can not even live on my own property without exposure with wireless being spread everywhere. Millions of Americans are already disabled from EMFs and most can not even use a wired device anymore because their sensitivity is too high. You are destroying the health of America and the environment creating a large microwave oven cooking everything within it. Radio Waves do not end. They continue forever. The younger generation that was raised with this technology is already severely damaged. Young kids, teenagers, and young adults are already disabled from EMFs and environmental toxins and can not go out in public without a complete meltdown from EMFs including EMFs found in artificial lighting (except incandescent which is the safest artificial lighting there is and is the hardest to get now). I get contacts regularly from young adults and parents with kids who have no place to go or live without EMF exposure. Their lives have already been stripped from them. Disabling America and ruining our economy with all this sickness and medical issues is not the answer. Foreign countries are removing wireless from their cities and public places because it is a worldwide epidemic and they are having to pay out disability for it. Russia never allowed high amounts of radiation to begin with and told the world that these cell towers and RF levels were way too high. Will they be the only country left without damaged DNA to reproduce and without their whole country disabled, sick, economically collapsed and famined? Wireless RF/EMFs reach everyone and everything 24/7. You can not opt out of it. It causes severe pain,	revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						brain fog, dementia, shuts down mitochondria and causes severe abnormal chronic fatigue, Parkinsons, Alzheimers, Diabetes type 3, shuts down kidneys/liver function, stops/paralyzes my heart, causes irregular heartbeat, anxiety, sharp painful heart jerking, rapid heart beat, cardiac arrest, headaches, joint pain, damages DNA, fertility, constant bleeding and severe abdominal pain, seizures, autism, ADHD, and so much more. It is the number one killer of bees and all pollinators along with birds, bats, frogs, etc. It makes animals and humans sick and destroys crops, trees, plants, etc as it weakens them and makes them more prone to sickness, disease, insect damage, etc. It also increases mold both in your body and environment over 600 times including Lyme disease. There is now a mold epidemic due to all the wireless. When wireless hits mold, mold creates a self-defense against it and creates mycotoxins to survive. Mycotoxins are a chemical toxin that can be more deadly than mold itself and is still toxic will killed. It is too small to filter and extremely hard to kill but the dead spores are just as dangerous. Your body creates autoimmune disease the same way when wireless radiation hits your body to try to defend itself against the radiation poison. RF/wireless is a carcinogenic, neurotoxin and genotoxin. Create safer technologies and safe zones where people can live with no wireless/RF radiation. Zone yourselves in and radiate only yourselves. Then when you are all dying from cancer, tumors, and sickness and have no more food after killing off all the pollinators, then let me know what ya think then? I will be sending all my construction and medical bills to any company or government that causes radiation to be on my property. The answer isn't to	

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						cover up symptoms. The answer is to remove the problem. Just because there is a new technology, it does not mean that we have to use it. Every person who has a part in wireless deployments will be personally held accountable in court for the damage it has created as crimes against humanity and the environment. The law suits are coming! I will attach a second word document with a list of videos, studies, medical information and more on the dangers of wireless radiation/EMFs along with a Worldwide list of wireless deactivation and removal that has already taken place due to this epidemic. Citizen Fully Disabled from EMFs and Tired of Corrupt Companies Destroying Our Health, Children, and Environment:	
South	12/15/2016	email (Attachment 1 "FirstNet Rebuttal") Page 5	Tara Schell		DPEIS Review	Tara Schell Virginia	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/15/2016	email (Attachment 2 "List of EMF Dangers" 43 pages	Tara Schell		DPEIS Review	See Word document attachment	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	email	Catherine Kleiber		DPEIS Review	Dear Ms. Walker, Thank you for your patience. Please find my comments and supporting documentation attached.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Please let me know if you are unable to obtain copies of other references I mention. Thank you again, Catherine Kleiber	references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	Attachment4 PallNeuropsychiatric2015.pdf	Catherine Kleiber		DPEIS Review	[Journal Article] (Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression [Martin L. Pall])	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	Attachment5 RFRadiation HarmsTrees.pdf	Catherine Kleiber		DPEIS Review	[Article by Commenter] RF Radiation From Wireless Technology Kills and Damages Trees By Catherine Kleiber (5 total pages -- see pdf which includes multiple photo images)	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	Attachment 6 Yakymenko et al 2015.pdf	Catherine Kleiber		DPEIS Review	[Journal Article] Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation (Igor Yakymenko)	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	Attachment 7 PlantEMFCA - ChannGal.pdf	Catherine Kleiber		DPEIS Review	[Journal Article] Electromagnetic Fields Act Similarly in Plants as in Animals: Probable Activation of Calcium Channels via Their Voltage Sensor	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed,

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
							independent studies to form the basis of its analysis.
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 1)		DPEIS Review	Dear Ms. Walker, Thank you for your attention to my comments. My main interest in critiquing the FirstNet PEIS documents is making sure that the environmental and health effects of the radiofrequency (RF) radiation that the wireless component of FirstNet will emit are appropriately factored into decisions about how to implement FirstNet. I address the serious deficiencies below. (Page numbers listed originate from Volume 1 Chapter 2 Draft Programatic Environmental Impact Statement for the Central United States, but the critique should be broadly applicable to the RF radiation section for all four regions.) There were seriously inaccurate statements made about the safety level assured by existing FCC RF radiation limits: p. 2-10 “For 20 years, the regulatory levels for human exposure to RF emissions have been established by the FCC as a means of protecting both workers and the general public from any potential effects.” p. 2-12 “These limits are based on thermal effects (i.e., the amount of RF energy required to heat tissue). According to the FCC, the established limits are well below levels that are considered to have adverse health effects.” Other government officials dispute claims such as these that FCC RF radiation limits provide sufficient population-based protection from harm during continuous exposures. The Department of Interior (DOI) said “the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today” (http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf), clearly indicating that they do not consider FCC RF radiation limits to be “protecting both workers and	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						the general public from any potential effects" as the PEIS states. Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, makes it clear in his correspondence with the EMR Policy Institute that "The FCC's current exposure guidelines, as well as those of the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-ionizing Radiation Protection, are thermally based, and do not apply to chronic, nonthermal exposure situations. They are believed to protect against injury that may be caused by acute exposures that result in tissue heating or electric shock and burn. The hazard level (for frequencies generally at or greater than 3 MHz) is based on a specific absorption dose-rate, SAR, associated with an effect that results from an increase in body temperature.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 1)		DPEIS Review	The FCC's exposure guideline is considered protective of effects arising from a thermal mechanism but not from all possible mechanisms. Therefore, the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified." (emphasis added) (http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf) This very credible evidence is unmentioned and ignored. As Mr. Hankin makes plain above, the FCC RF radiation limits are not protective from all adverse effects only those from thermal mechanisms during acute exposures, so the second sentence of the quote	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	Attachment 2 (Sanitary_Norms.pdf)	Catherine Kleiber (page 1)		DPEIS Review	« _28 _» _ November 2003_г. № 69 Permissible levels of high-frequency electromagnetic pollutions' voltage in a wires of industrial frequency alternating current Sanitary-epidemiologic norms 1 General provisions 1. Sanitary-and-epidemiologic norms «Permissible levels of high-frequency electromagnetic	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed,

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						pollutions' voltage in a wires of industrial frequency alternating current» (further - norms) define levels electromagnetic pollutions in electric wires of power supply of an industrial electric equipment, office techniques, electrical household appliances in a range 1 kiloHertz – 400 kiloHertz (further – kHz). 2. The present norms are directed on improvement and optimization of a sanitary-epidemiologic situation and prevention of environmental contamination by electromagnetic radiation, and also management of corresponding risk, in addition to existing norms. 3. Heads of the organizations and physical persons which activity is connected to operation of the industrial organizations using the equipment and devices, being sources of electromagnetic radiation, provide maintenance of requirements of the present norms. 4. In the present norms the following terms and definitions are used: 1) electromagnetic pollution – parasitic (casual) frequencies in a network of an alternating current of industrial frequency of 50 Hertz (further – Hz) which source is not determined; 2) electromagnetic pollutions – one of kinds of electromagnetic pollution in a range of frequencies 1 kHz – 400 kHz, arising in networks of an alternating current of industrial frequency. 2 Permissible level of electromagnetic pollutions' voltage 5. The permissible level of a high-frequency electromagnetic pollutions' voltage in a range of frequencies 1-400 kHz in a wires of an alternating current of industrial frequency of 50 Hz should not exceed 0,05 volts (further – V) 50 millivolts (further – mV).	independent studies to form the basis of its analysis.

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South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 1)		DPEIS Review	Public Listening Session Comment November 18, 2016 My name is Catherine Kleiber. I have radiofrequency sickness, an environmentally-induced functional impairment caused by exposure to radiofrequencies, from either wireless technology or "dirty" electricity. I am addressing you today to highlight the need to again make public places and buildings accessible for people with radiofrequency sickness. I experience many symptoms, including cardiac arrhythmias, cognitive difficulties, memory problems, headaches, and fatigue when I am around radiation from wireless technology. The presence of wireless internet and wireless devices in public places now prevents me from using the public library or the judicial system, participating in public meetings, going to restaurants, going shopping, and using public transportation. All are things that I used to be able to do without experiencing functional impairment prior to the proliferation of wireless devices. Most importantly, I can no longer safely access medical care due to the ubiquitous presence of wireless technology in hospitals and clinics. I am not alone. Over 300 comments from U.S. citizens pleading with the FCC to establish biologically-based safety limits for radiofrequency radiation to replace the existing outdated thermally-based radiofrequency limits were submitted in their docket to re-evaluate the RF limits. It is extremely important that people with radiofrequency sickness be able to access hospitals, medical facilities, and government buildings. WiFi and other wireless technology poses a significant, potentially life-threatening, access barrier for people with radiofrequency sickness. Access to medical care is generally considered a human right, a right now being denied those with radiofrequency sickness. Access to public facilities by people with radiofrequency sickness is protected under the 2008	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						ADA Amendments which specifically protects individuals with environmentally-induced functional impairments. Radiofrequency sickness is a functional impairment induced by radiofrequency exposure, which can cause serious, even life-threatening functional impairment. A replicated double-blind placebo-controlled study documented that cardiac arrhythmias occur in some people in response to exposure to radiation from cordless phones. This is obviously a potentially lifethreatening functional impairment. My children experience cardiac arrhythmia in response to radiation from wireless technology, as do I.	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 1)		DPEIS Review	My husband, a type 1 diabetic, finds that his blood sugar elevates markedly in response to radiation from wireless technology. If he tries to compensate by taking additional insulin, as he normally would, his blood sugar plunges dangerously low upon leaving the affected area. He recently had a new and very scary reaction. While at a federal office for an essential appointment, he was forced into close proximity to two functional smart phones and a WiFiing computer. He went into the office feeling fine with a normal blood sugar and came out with a very high blood sugar, a very elevated body temperature of 101 degrees Farenheit, and feeling awful. It took two days for his blood sugar and body temperature to return to normal and about a week to feel well. RF has been shown to cause calcium ion efflux. Inappropriate calcium efflux is known to cause a condition called malignant hyperthermia which can be fatal and is usually caused by certain anesthetics. Fortunately for him, the reaction stopped accelerating when he came home to our shielded house and then crawled into our shielded bed. It could easily be a fatal reaction for someone who did not realize what	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						was happening. The presence of wireless radiation at levels which cause functional impairment is making it harder for us to earn our living. We had to quit bringing our pasture-raised meat products to the local farmers markets two years ago since my husband could no longer be at the market without experiencing serious neurological effects suggestive of early ALS that disappeared when he stopped attending market. I have not been able to function well enough cognitively at the market to vend for several years. Being unable to sell at the market has decreased our ability to earn our living.	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 10)		DPEIS Review	Eskander EF, Estefan SF, Abd-Rabou AA. How does long term exposure to base stations and mobile phones affect human hormone profiles? Clinical Biochemistry 45 (2012) 157–161 RF radiation alters heart electrical activities and causes ventricular enlargement in rats. Additionally, "The histopathological examination revealed hypertrophy, fragmentation and vacuolation of the myocardium, which were directly proportional to the exposure time." Fatma A. Mohamed, Azza A. Ahmed, Bataa M.A. El- Kafoury, & Noha N. Lasheen. Study Of The Cardiovascular Effects Of Exposure To Electromagnetic Field. Life Science Journal. 2011;8(1):260-274. These findings have enormous implications for cardiac health in a chronically RF exposed population.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 11)		DPEIS Review	References 1. Alster, N. (2015). Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates. Harvard University's Edmond J. Safra Center for Ethics. http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf 2. Buchner, K. and Eger, H. 2010 Changes of	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Clinically Important Neurotransmitters under the Influence of Modulated RF Fields A Long-term Study under Real-life Conditions 3. Cherry, N. (2000). Criticism of the Health Assessment in the ICNIRP Guidelines for Radiofrequency and Microwave Radiation (100 kHz-300 GHz) www.electricalpollution.com/documents/Cherry2000EMR_ICNIRP_critique_09-02.pdf 4. Dodge, C. (1969). Clinical and Hygienic Aspects of Exposure to Electromagnetic Fields. Biological Effects and Health Implications of Microwave Radiation, Symposium Proceedings, Richmond, Virginia, September 17-19. http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge_1969.pdf 5. EMF Scientist (2015). International Scientists Appeal to U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology http://www.EMFscientist.org 6. Eskander, E.F., Estefan, S.F., and Abd-Rabou, A.A. Case Report How does long term exposure to base stations and mobile phones affect human hormone profiles? Clinical Biochemistry 45 (2012) 157–161. 7. Fatma A. Mohamed, Azza A. Ahmed, Bataa M.A. El- Kafoury, & Noha N. Lasheen. Study Of The Cardiovascular Effects Of Exposure To Electromagnetic Field. Life Science Journal. 2011;8(1): 260-274] (ISSN:1097–8135). http://www.lifesciencesite.com. 8. Hankin, N (2002), Center for Science and Risk Assessment, Radiation Protection Division, EPA, correspondence regarding the limitations and purpose of the FCC exposure standards. http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf 9. Havas M, Marrongelle J, Pollner B, et al. (2010). Provocation study using heart rate variability	

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						shows microwave radiation from DECT phone affects autonomic nervous system. Eur. J. Oncol. Library, ; 5:273-300. http:// www.magdahavas.com/wordpress/wp-content/uploads/2012/01/Havas-HRV-Ramazzini.pdf	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 11)		DPEIS Review	10. Havas, M., Marrongelle, J. (2013). Replication of Heart Rate Variability Provocation Study with 2.4GHz Cordless Phone Confirms Original Findings. Electromagn Biol Med Jun;32(2):253-66. doi:10.3109/15368378.2013.776437. http:// www.ncbi.nlm.nih.gov/pubmed/23675629# 11. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. (2013) Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields.102. http://monographs.iarc.fr/ENG/ Monographs/vol102/mono102.pdf 12. ICNIRP Statement (2002). General Approach to Protection Against Non-Ionizing Radiation Protection. Health Physics 82(4):540-548. https://www.icnirp.org/documents/philosophy.pdf 13. Marha K, Musil J, Tuha H. Electromagnetic Fields and the Life Environment. San Francisco (CA):San Francisco Press, Inc.; 1971. 14. NTP (2016). Report of Partial Findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposures) bioRxiv preprint first posted online May. 26, 2016; http://dx.doi.org/10.1101/055699 15. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard Recent Res Devel Mol Cell Biol 7.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqu	Catherine Kleiber (page 12)		DPEIS Review	16. Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. J Chem	Thank you for your review and comments. FirstNet has revised the section on RF

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
		eDec2016.pdf)				Neuroanat DOI: 10.1016/j.jchemneu. 2015.08.001. http://dx.doi.org/10.1016/j.jchemneu.2015.08.001 17. Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. 18. Powell, R. (2013). "Biological Effects from RF Radiation at Low-Intensity Exposure, based on the BioInitiative 2012 Report, and the Implications for Smart Meters and Smart Appliances" http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf 19. Sage, C., Carptenter D., ed. (2012) BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Radiation. BioInitiative Working Group, at www.bioinitiative.org, December 31, 2012. 20. Sailia, L., Hanini, A., Smirani, C., et al. (2015). Effects of acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit. Environmental Toxicology and Pharmacology 40:600–605. 21. Taylor, W. (2014). U.S. Department of Interior, Willie Taylor, Director of the Office of Environmental Policy and Compliance, Comment on National Telecommunications and Information Administration plans for FirstNet, Feb 7, 2014, ER 14/0001 and ER 14/0004. http:// www.ntia.doc.gov/files/ntia/us_doi_comments.pdf 22. Wyde, M. (2016) The U.S. NTP Study: A Real Game Changer or Just Another Study? BioElectroMagnetic Society Conference: June 8, 2016. 23. Yakymenko, I., Tsybulin, O., Sidorik, E., et al.	emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						(2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. Electromagn Biol Med. Jul;7:1-16. http:// www.ncbi.nlm.nih.gov/pubmed/26151230#	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 2)		DPEIS Review	from the PEIS (p 2-12), and copied above, is an implicit lie. Whether this is intentional or inadvertent, it should be corrected. FCC RF radiation limits are based on thermal effects in a large male. They are not population-protective. They do not and were never intended to protect from biological effects or even thermal effects during the chronic exposures we all experience today and which FirstNet would increase. Even ICNIRP acknowledges the need to adjust their RF radiation guidelines (referred to here as NIR): "Different groups in a population may have differences in their ability to tolerate a particular NIR (nonionizing radiation) exposure. For example, children, the elderly, and some chronically ill people might have a lower tolerance for one or more forms of NIR exposure than the rest of the population. Under such circumstances, it may be useful or necessary to develop separate guideline levels for different groups within the general population, but it may be more effective to adjust the guidelines for the general population to include such groups. Some guidelines may still not provide adequate protection for certain sensitive individuals nor for normal individuals exposed concomitantly to other agents, which may exacerbate the effect of the NIR exposure, an example being individuals with photosensitivity." from ICNIRP STATEMENT, GENERAL APPROACH TO PROTECTION AGAINST NON-IONIZING RADIATION PROTECTION, (HEALTH PHYSICS 82(4):540-548; 2002) https://www.icnirp.org/documents/philosophy.pdf After the release of the U.S. National Toxicology Program (NTP) findings showing that non-thermal	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						RF radiation exposures cause DNA breakage and cancer, the Institute for Electrical and Electronics Engineers (IEEE) posted an article with comments from Kenneth Foster of the IEEE committee that reviews RF radiation exposure limits: With the NTP study results, Foster expects more governments to put out cautionary guidelines and radiation labeling for cellphones. He says he wouldn't be surprised if California adds RF radiation to its Proposition 65 list of carcinogenic chemicals, and if the IARC ups its classification rating from 2B: possibly carcinogenic to humans to 2A: probably carcinogenic to humans. "And they wouldn't be out of line in doing that," he says. "This is going to change the rhetoric in the field. People can point to much more hard evidence that [cellphone RF exposure] really is a problem." (http://spectrum.ieee.org/the-human-os/biomedical/ethics/cellphone-radiation-causescancer-in-rats)	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 2)		DPEIS Review	Th omission of the U.S. NTP findings from the PEIS RF radiation section is a very serious one and should be remedied. FirstNet cannot argue the U.S. National Toxicology Program is not a sufficiently reputable. P. 2-18 "However, the BWG [BioInitiative Working Group] itself has been criticized by other scientific, professional, and governmental bodies for ignoring conflicting, inconsistent, or other credible evidence that clashed with its report (e.g., (Dolan, M. and J. Rowley, 2009))." The BioInitiative Working Group, a group of researchers and public health experts, are criticized in this quote with attribution to a paper written by representatives of telecom industry interest groups. This is analogous to dismissing the body of research on the health effects of tobacco, asbestos, or lead paint due to a critique by industry representatives. This was done for years and we have	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						now seen what a mistake it was to allow it. Hundreds of thousands of people lost their lives due to the regulatory delays that resulted from allowing industry to dismiss research critical of it. This article is not different. If its opinions warrant inclusion in the PEIS at all, they should be clearly attributed as representing the telecom industry. This was definitely not done.	
South	12/16/2016	Attachment 2 (Sanitary_Norms.pdf)	Catherine Kleiber (page 2)		DPEIS Review	3 Choice of points of the control 6. Control points get out in the socket of wires of an alternating current of industrial frequency (50 Hz), taking place near to a plug (socket) of a cable of the connected equipment. The number of control points depends on number of workplaces. In each control point one measurement is carried out. 4 Recommended devices for the control 7. For the control high-frequency electromagnetic pollutions in a range of frequencies (1-400) kHz in a wires of an alternating current of industrial frequency of 50 Hz are recommended to be used millivoltmeter, having corresponding characteristics and registered in the State Register of Republic of Kazakhstan. 5 Requirements to carrying out of measurement 8. The device is plugged into socket of an alternating current in a control point. 9. Tap switch of ranges necessary to put in position of 1-2 V. 10. If indications are not fixed or are small, tap switch put in position 100-999 mV or in position 1,1-99,9 mV, depending on a registered level of a voltage. Results are registered and compared to the norms specified in item 5 of the present norms.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.
South	12/16/2016	Attachment 3 (NIDILRRCa	Catherine Kleiber (page 2)		DPEIS Review	Obviously, if we cannot tolerate the RF environment outside in the city, working in an office or store in the city with their multiplicity of WiFi routers and high	Thank you for your review and comments. FirstNet has revised the section on RF

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
		tharineNov2016.pdf)				volumes of individual cellphones would not be possible. Disability claims related to symptoms or syndromes which have been connected to functional impairment by RF (RF Sickness) are rising. People with multiple sclerosis, fibromyalgia, chronic fatigue syndrome, asthma, and diabetes have improved when their RF exposure from wireless technology and "dirty" electricity is minimized. Eliminating RF from public places will improve accessibility and decrease disability. It is time that national accessibility standards address the very serious access barrier posed by radiofrequency pollution. Background Our Experience: Wireless Technology is an Access Barrier Radiofrequency radiation, such as the radiation given off by wireless devices and their base stations (antennas) can cause an environmentally-induced functional impairment called Radiofrequency sickness (see Dodge http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge_1969.pdf). I have radiofrequency sickness which was originally misdiagnosed as chronic fatigue syndrome. However, once I found out I was being exposed to large amounts of radiofrequencies from electrical pollution, including "dirty" power on my wires and plumbing, and reduced that exposure as much as I was able, I began to recover almost immediately. Here is a brief summary of symptoms I experienced as a result of the functional impairment caused by radiofrequency exposure from electrical pollution: heart palpitations, very pain sensitive, constant nerve pain, sluggish reactions, poor depth perception, muscle weakness, lactic acid buildup with little exertion, unrefreshing	emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						sleep, often wakeful in the night, fatigue, night sweats, poor circulation to my extremities, reflux, difficulty concentrating, difficulty thinking, inability to make decisions, low-grade fever and chills, headaches, and a dry sore throat. After we reduced our exposure as much as possible, I was well at home for years and able to participate in family gatherings, go to the doctors, and generally participate in society because I could always plug in filters to minimize the electrical pollution.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 3)		DPEIS Review	On p. 2-12, studies are cited as finding that even with roof-top antennas, measurements inside those buildings are low compared to FCC limits, scant comfort since we already established that the government knows that the FCC limits are "...now nearly 30 years out of date and inapplicable today." Discussion about findings of widespread violations of FCC limits are omitted from the discussion, but are highly relevant and should be included. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF radiation limits and rampant violations (http://www.marketwire.com/press-release/-1770139.htm). A Wall Street Journal investigation (http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015. The fact that the FCC is incredibly lax, even negligent, in taking regulatory action even when violations are reported, never mind going out and conducting unannounced spot inspections, should be of great concern and should be a factor considered in the PEIS. Additionally, these studies are old and date to a time when few people used wireless in many	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						areas and there were many fewer antennas. One major failing of the FCC limits that merits discussion in the PEIS is the fact that they govern each antenna separately. Collocations result in much higher RF radiation levels around the site because each antenna still broadcasts at the same level as if there were no collocation. Transmission from other antenna sites and mobile devices further increase ambient exposure levels. This must be discussed in the PEIS as an environmental impact since the purpose of the broadband provision portion of FirstNet's mission mentioned on p. 2-8 is to encourage the use of wireless technology which will in turn increase the ambient RF radiation levels from both devices and base station antennas. In the example on p. 2-14, each antenna produces a field of 477µW/m2 at ground level, but collocation of 4 such arrays (which is not uncommon) would result in 1,908 µW/m2 at ground level. This is still below the FCC RF radiation limits, but which we established above are outdated and meaningless according to the DOI and not protective in chronic exposure situations according to the EPA.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 3)		DPEIS Review	Even 477µW/m2 exceeds levels shown in studies to cause biological effects, specifically negative effects related to sleep, stress, immune function, brain cancer, breakage of the blood-brain barrier, other cancers, reproduction, and oxidative damage. A ground level of 1,908 µW/m2 exceeds levels shown in studies to cause heart effects and calcium metabolic effects (http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf). Thus, surrounding areas will certainly be exposed to high enough RF radiation levels on the ground to cause serious biological effects. RF radiation levels in portions of neighboring buildings elevated above ground level are likely to be	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						even higher. On p. 2-11, there is a list of "Some of the major problems with demonstrating cause and effect for RF" which seem to be cited as excusing FirstNet from an obligation to take action to protect the public and the environment. Each point is addressed below. "No consistent measures of exposure. Exposure is changing with the proliferation of cell phone use, and there is no real unexposed or "control" population (Ahlbom et al., 2004) (Khurana et al., 2010)" While the absence of a control population cannot be used to justify inaction, it does support the high level of urgency to making sure that public health policy and regulations related to RF radiation exposure are sufficiently protective since everyone is exposed.	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 3)		DPEIS Review	We had children. When my youngest was about three, our utility began installing transmitting electrical meters in the area. Shortly after that we all began experiencing serious functional impairment, even at home, from the radiofrequency pollution the transmitting electrical meters put on the electrical wiring along with the power line communications frequencies. Utilities providing basic service (electricity, gas, and water) should not be allowed to use transmitting utility meters. There are many examples of utility companies bullying customers with threats of disconnected service to force them to take transmitting utility meters, including my family. There are many examples of people being disabled by the radiation from transmitting utility meters and even forced from the neighborhood by the radiation from neighbors' utility meters, even when they have been able to have an analog meter on their own home (see FCC docket below for some of them). We still had analog meters and yet, the radiation coming off of our	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						end-of-the-line transformer from all the meters and cell towers caused cardiac arrhythmias in our two young children and for my husband and me. We slept in a tent well away from the building site while we tried to deal with the utility and PSC. Our younger son's heart rate got so slow one night when we were forced by broken tent poles to sleep at home that he lost bladder control, wetting only his underwear because the volume of urine was so small. When I went to him in response to his call, he was agitated and upset, but his heart rate was very slow and the beats were weak and irregular. This continued for a couple of hours. We did not sleep in the house again after that until the utility company removed the secondary power line from their transformer to our house. It was obvious the situation was too dangerous to be allowed to continue. So, we did the only thing we could do and told the utilities to remove our service and we went off-grid since they refused to even properly investigate the situation, never mind do anything. After going completely off-grid, we had three heavenly weeks. We slept well, felt well, and had lots of energy. Our pets' health improved. Most importantly, our sons' cardiac rhythms had almost completely normalized. Unfortunately, the toxic exposure we received has left our whole family extremely sensitized to radiofrequency radiation so when, in early January 2012, 4G cellphone service was installed in our area we began to experience impairment quickly. Within a week, our sons' cardiac rhythms were again highly irregular. Our younger son was again waking us in the night crying and feeling unwell with a highly irregular cardiac rhythm. We have shielded in various ways and keep pulling them back from the brink.	

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South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 3)		DPEIS Review	The drastic measures we have taken (e.g. going off-grid, shielding) to reduce their exposure have momentarily stabilized them at about early stage 2 radiofrequency sickness. (See Dodge) We are very concerned that any increase in the radiofrequency radiation levels could again push them over the edge toward stage 3 radiofrequency sickness. They should not be involuntarily exposed to a pollutant that has such profound detrimental effects on them. We are literally trapped on our farm and in our home as outdoor radiofrequency radiation levels have climbed rapidly over the few years. We have had to restrict the amount of time our outdoors-loving sons can be outside. They are now only able to be out a half an hour at a time a few times a week. If they are out more than that with any regularity their cardiac arrhythmias become severe enough that they become symptomatic. We have difficulty going anywhere due to all the radiation from towers and the WiFi and cellphones present indoors are even worse, often causing symptomatic arrhythmias almost immediately. Because of the serious effects exposure to radiofrequencies has on my health, we have never owned a cellphone, cordless phones, wireless router, baby monitors, or subscribed to wireless internet. Our children both experience health problems when exposed to radiofrequencies. They feel sick, become hyperactive, less able to think logically and control their behavior. They also sleep poorly in bad radiofrequency environments. The recent increase in radiofrequency radiation exposure from the transmitting electrical meters and wireless technology has given them chronic cardiac arrhythmias which improve when we can reduce their exposure. We have done this several times only to have ambient levels increase and cause the arrhythmia to return. We are homeschooling them so they will not be	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						exposed to the dangerous radiofrequency environment in our local public school. The school has both WiFi and high electrical pollution levels. We are unable to bring them to the zoo, museums, most parks, indeed almost anywhere, because of the ubiquitous presence of radiation from wireless technology.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 4)		DPEIS Review	Exact continuity of exposure measurement is not necessary between studies as long as care has been used within each study to be consistent. Studies show that RF radiation has very serious biological effects at levels far below existing FCC RF radiation limits. Below are some examples of serious clinically important biological effects resulting from real-life RF radiation exposures: Cardiac arrhythmias can be caused by wireless technology. Recent replicated double blind studies show that a cordless phone base station operating at WiFi frequencies can cause cardiac arrhythmias in susceptible individuals. This short video discusses the cardiac effect that wireless can have- http://www.youtube.com/watch?v=_EI9fZX4iww. View this video http://www.youtube.com/watch?v=sv1E9IXUd6M to see further discussion. You can read the studies at http:// www.magdahavas.com/wordpress/wp-content/uploads/2012/01/Havas-HRV-Ramazzini.pdf and http:// www.ncbi.nlm.nih.gov/pubmed/23675629#. Obviously, for susceptible people (like those of us with radiofrequency sickness), WiFi can make whole buildings inaccessible and unsafe. A recent study in rabbits found that not only did WiFi change heart function parameters, but it dramatically changed the cardiac effects of both dopamine and epinephrine: Saili L, et al. Effects of	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit. Environmental Toxicology and Pharmacology 40 (2015) 600–605. A mouse cardiac study showed that mice exposed to RF radiation from a cellphone had significantly lower vitamin D levels, low calcium, low antioxidant capacity, low cardiac tissue MDA and elevated renin levels compared to controls. They also had enlarged left ventricles and ECG abnormalities (Fatma 2011). Both these cardiac effects are pre-disposing factors toward cardiac arrest. Obviously, these serious cardiac effects caused by RF radiation exposures from consumer devices ought to be discussed in the PEIS, since FirstNet will be promoting their use and emitting radiation levels from its antennas comparable to these exposures.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 4)		DPEIS Review	Cancer levels around antennas are elevated and FirstNet will either be elevating already heightened risks by adding collocation antennas, increasing emissions of existing antennas by increasing use, or putting up new towers and increasing cancer risk in those around them. This should be discussed in the PEIS. "The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer" (http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18) found significant increases in cancer risk at RF radiation levels below FCC RF radiation limits. Other studies have as well. These merit serious consideration in the FirstNet PEIS and should not be omitted. Anything that will increase cancer risk for a large segment of the population should be considered very carefully. A review by Dr. Cherry (2000). Criticism of the Health Assessment in the ICNIRP Guidelinesfor Radiofrequency and Microwave	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						Radiation (100 kHz- 300 GHz) www.electricalpollution.com/documents/Cherry2000EMR_ICNIRP_critique_09-02.pdf discusses common errors in understanding about RF radiation exposures and studies and is, as its title states a criticism of ICNIRP. Radiofrequency radiation exposure causes important endocrine changes. "Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions" (http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf) is an important study documenting hormonal changes in residents before installation of a cellphone antenna and for a year and a half afterward. They found initial hormone level increases consistent with a stress response to RF radiation exposure levels as low as 60µW/m2. Initially adrenaline and noradrenaline increased and dopamine and phenylethylamine (PEA) levels decreased. While adrenaline and noradrenaline did decrease, dopamine and PEA levels never returned to pre-base station levels, remaining substantially lower during the year and a half of the study. According to the authors "This is of considerable clinical relevance because psychiatric symptoms also exhibit altered PEA levels.	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 4)		DPEIS Review	Our social isolation by wireless technology is a total violation of our civil rights. Wireless technology needs to be eliminated from public buildings and public places. Elimination of Wireless from Public Buildings and Public Places is a Reasonable Accommodation In consideration of wireless technology's exclusionary effect and the very real	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed,

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						threat it poses to public health (see www.bioinitiative.org and http://www.iarc.fr/en/media-centre/pr/2011/pdfs /pr208_E.pdf) and the environment (http://www.moef.nic.in/downloads/public-information/final_mobile_towers_report.pdf), it is reasonable to eliminate radiation from wireless devices from the public arena. Internet access should be provided using publicly available wired connections. In addition, radiofrequency radiation detectors can remind people to turn off wireless devices as they enter public buildings. My family's on-going nightmare of societal exclusion and serious functional impairment, caused by the presence of biologically active levels of radiofrequencies on the electrical grid and radiofrequency radiation transmitted into the environment through use of wireless technology, is illustrative of why it is essential to establish biologically-based radiofrequency radiation safety limits. The Environmental Protection Agency should be given the authority to do so since the FCC lacks the expertise. In the meantime, eliminating radiation from wireless technology from public places would allow people with radiofrequency sickness to participate in society. I have maintained the website www.electricalpollution.com since 2002, shortly after I discovered that the radiofrequencies present on building wiring and flowing across the ground from non-linear time varying loads were making me, and others, sick. Research on the health effects of electrical pollution is available on the website on the Research Page. More technical information is available on the Technical Page. Electrical pollution is a very potent form of exposure to radiofrequencies. Exposure to all forms of radiofrequencies, including electrical pollution, must be included in standards	independent studies to form the basis of its analysis.

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						regulating exposure of the general public to protect the public health during continuous exposure. I have read widely on the research into the health effects of exposure to radiofrequencies. There is a growing body of evidence that the increased exposure to radiofrequencies from radiowave and microwave transmitters and from electrical pollution are behind the public health crisis that has dramatically increased utilization of our medical system for chronic conditions.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 5)		DPEIS Review	In Rimbach, the increase in sleep problems, cephalgia, vertigo, concentration problems, and allergies could be clinically documented after the cell phone base station had been activated. The newly developed symptoms can be explained clinically with the help of disturbances in the humoral stress axis." These long-term debilitating effects of cell towers must be mentioned in the PEIS and weighed in the decision making about how to move forward with FirstNet. "How does long term exposure to base stations and mobile phones affect human hormone profiles?," Eskander et al. (http://www.sciencedirect.com/science/article/pii/S0009912011027330) is a very important study which documented hormonal changes occurring over time with chronic exposures to base station antennas or cell phones. It is extremely important that ACTH, cortisol, and T4 were significantly reduced in exposed individuals compared to controls. So were testosterone, progesterone, and prolactin. These effects became more pronounced over time. Endocrine disruption is extremely important clinically and should be considered as an extremely negative effect of the planned wireless portion of FirstNet. It should not be omitted from the FirstNet PEIS. "No scientifically agreed upon biological mechanism	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						for harm. The lack of a clear biological mechanism increases uncertainty into whether the health end point that the study examined is the correct endpoint to try and measure (Hauri et al., 2014) (Ahlbom et al., 2004)" Agreed upon by whom? The telecom industry? There are two mechanisms by which RF radiation produces biological effects that are currently well-supported by research literature. One is oxidation caused by RF radiation exposure (http://www.ncbi.nlm.nih.gov/pubmed/26151230). Oxidation can occur even with non-ionizing radiation exposure. At least 93 studies have now found that RF radiation has oxidative effects. Oxidation has important biological effects. Yakymenko states "In addition, ROS at relatively low concentrations can modulate inflammation via activation of NF-kB pathway (Hayden and Ghosh, 2011). Therefore, even subtle exposures to RFR with generation of hardly detectable quantities of free radicals can have their meaningful biological consequences." This is because "free radicals/ROS are an intrinsic part of the cellular signaling cascades." Increasing population-wide exposure to an unavoidable oxidant will have profound effects on public health and the environment and should be discussed and weighed appropriately in the FirstNet PEIS.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 5)		DPEIS Review	The second is the ability of non-thermal levels of RF radiation to cause voltage-gated Ca2+ ion channels to open inappropriately. This can have profound and detrimental biological effects because Ca2+ is utilized in many cellular and intercellular systems as a messenger, meaning that when the voltage-gated Ca2+ ion channel opens inappropriately it sets off a cascade that affects metabolic activities within the cell or body. Not only is Ca2+ efflux well-documented in the	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						literature, but a reasonable mechanistic explanation for how very low RF radiation levels can cause voltage-gated Ca2+ channels to open is elucidated by Dr. Martin Pall in Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor, Current Chemical Biology, 2016, Vol. 10, No. 1., as follows: "The voltage sensor opens the ion channel due to the action of changes in the electrical force across the plasma membrane acting directly on these 20 voltage sensor charges [8]. The structure of the VGCC voltage sensor is discussed in more detail in the Discussion section below. It is plausible, therefore, that the electrical forces of these low intensity EMFs act through their electrical effects on the voltage sensor to activate the VGCCs. It is predicted that the forces on the 20 charges in the VGCC voltage sensor are highly amplified because of two important factors [2]. The law of physics called Coulomb's law predicts that forces on charged groups are inversely proportional to the dielectric constant of the medium in which the charges occur. Because the dielectric constant of the aqueous phases in the cell or extracellular medium are about 120 times higher than the dielectric constant of the lipid bilayer [2], this predicts that forces on the each of the 20 charges of the voltage sensor are about 120 times higher than are electrical forces on singly charged groups in the aqueous phases. In addition, Sheppard et al. [10], predicted that the electrical forces produced by EMFs across the plasma membrane are amplified about 3000-fold compared with the forces in the aqueous phases because of the high electrical resistance of the plasma membrane. It follows from this, that the forces on the voltage sensor are estimated to be vastly increased as compared with forces on aqueous phase single	

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						charges, where most if not all charged groups occur: 20(# of charges in voltage sensor) X 120 (from the dielectric constant) X 3000 (amplification at the plasma membrane) = 7.2 million	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 5)		DPEIS Review	The article by Halberg and Johansson in Pathophysiology1 supports this contention. The comprehensive review by Dr. Cherry, which documents health effects and explores mechanisms, besides thermal mechanisms, through which microwave and radiowave radiation can impact health, also supports the contention that exposure to microwave and radiowave radiation is a public health threat which is probably contributing to significant public illness. A review of the Soviet literature on radiofrequency sickness by Christopher Dodge3 of the Naval Observatory discusses radiofrequency sickness in detail. The symptoms attributed to chronic exposure to radiofrequency radiation mirror the deterioration of health being seen in the U.S. in recent years, probably due to the dramatic increase in exposure to radiofrequencies from electrical pollution and wireless technology. Papers by Dr. Milham4, Dr. Havas5,6,7 and Dr. Wertheimer8 also show that exposure to electrical pollution constitutes a public health threat, as does a report by Char Sbraggia regarding health improvements experienced by teachers and students when the electrical pollution in their school was cleaned up (http://www.electricalpollution.com/images/MelMinNurse.jpeg). These are just a few of the papers I have read. However, they provide a picture which should illustrate how reasonable it is to institute the accommodations necessary to enable people with radiofrequency sickness to participate in community life, utilize public services, and enter public buildings. 1. Ö. Hallberg, O. Johansson, Apparent decreases in Swedish public health indicators after1997—Are	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						they due to improved diagnostics or to environmental factors? Pathophysiology(2009) 2. Cherry, N. 2000 Criticism of the Health Assessment in the ICNIRP Guidelines for Radiofrequency and Microwave Radiation (100 kHz- 300 GHz) 3. Dodge C. Clinical and Hygienic Aspects of Exposure to Electromagnetic Fields. Biological Effects and Health Implications of Microwave Radiation, Symposium Proceedings, Richmond, Virginia, September 17-19, 1969. 4. Milham S, Morgan L. 2008 A New Electromagnetic Exposure Metric: High Frequency Voltage Transients Associated With Increased Cancer Incidence in Teachers in a California School. American Journal of Industrial Medicine.	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 5)		DPEIS Review	5. Havas M, Olstad A. 2008. Power quality affects teacher wellbeing and student behavior in three Minnesota Schools, Science of the Total Environment, July. 6. Havas M. 2006. Electromagnetic hypersensitivity: biological effects of dirty electricity with emphasis on diabetes and multiple sclerosis. Electromagnetic Biology Medicine 25(4):259-68. 7. Havas M. 2008. Dirty Electricity Elevates Blood Sugar Among Electrically Sensitive Diabetics and May Explain Brittle Diabetes. Electromagnetic Biology and Medicine, 27:135-146. 8. Wertheimer N, Savitz DA, Leeper E. 1995 Childhood Cancer in Relation to Indicators of Magnetic Fields from Ground Current Sources Bioelectromagnetics 16: 86-96. Accommodations for people with radiofrequency sickness are really common sense and societally beneficial because radiofrequency radiation poses a serious threat to the public health. “Public safety standards are 1,000 – 10,000 or more	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						times higher than levels now commonly reported in mobile phone base station studies to cause bioeffects."(http://www.bioinitiative.org/conclusions/) Accommodations necessary for people with radiofrequency sickness Provision of Basic Services: Utilites - water, gas, electric People with radiofrequency sickness are being forced to choose between forced to experience serious environmentally-induced functional impairment in order to access utility services. NIDILRR needs to put the PSC/PUCs on notice that it is their job to force utility companies to comply with the 2008 ADA Amendments which require accommodation of people with environmentally-induced functional impairment. At this time, many utilities and PSC/PUCs are flatly refusing to provide any accommodation, never mind the important accommodation of metering utility service with an analog mechanical meter which used to be standard operating procedure until recently. Many utilities are pretending these meters are no longer available. They are.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 6)		DPEIS Review	Because of this, the electrical forces placed on the voltage sensor by these EMFs is calculated to be approximately 7.2 million times higher than are the forces placed on singly charged groups located elsewhere in the cell because these singly charged groups are predominantly in the aqueous phase [2]. It is highly plausible, therefore, that this extraordinary sensitivity of the voltage sensor to such weak electrical effects is the final answer to this long puzzle of how such low intensity EMFs can produce biological effects in many animals, including humans." This important mechanism explains many of the biological effects RF radiation can have at	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						levels far below the outdated FCC RF radiation limits and far below the levels that FirstNet would emit. Obviously this should be discussed in the PEIS and provides reasons for modifying the execution of FirstNet. "Some potential effects of major concern are rare, such as brain cancer and acoustic neuroma, both of which have been potentially linked to RF exposure. If the health outcome is rare, it is even harder to demonstrate cause and effect (Ahlbom et al., 2004)." Even rare effects are significant when the whole population is being exposed to the causal agent. The early study cited here likely contain gross underestimates of the effect of RF radiation exposure on brain cancers and acoustic neuroma due to the long latencies normally involved in brain cancers (30-40 years). That studies are already finding effects should highlight the truly dangerous nature of RF radiation as a carcinogen. The U.S. NTP study should be discussed here. It found that non-thermal levels of RF radiation break DNA (considered the hallmark of a carcinogen) and increases the risk of glioma of the brain and heart (http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancerstudy/). Furthermore, rates of Glioblastoma Multiforme, a type of glioma, is increasing 1.3%-2.3% per year over a 15-year period, which was statistically significant http://microwavenews.com/news-center/ntp-and-brain-tumor-rates). Thus, controlled lab studies and epidemiological findings are in agreement. A replicated European study found that RF radiation promotes cancer growth, supporting the carcinogenicity of RF radiation (Lerchl, et. al., 2015 (http://www.ncbi.nlm.nih.gov/pubmed/25749340). Exposures were non-thermal and well-below existing FCC RF radiation limits. These findings, especially taken together, should carry a lot of weight and	

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						strongly suggest the need for precaution, especially with the studies above showing that cellular base station antennas cause increases in cancer.	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 6)		DPEIS Review	Telephone Telephone companies must be required to provide RF interference-free copperwire telephone service to people with RF sickness. Most people with RF sickness cannot use cellphones. Cable phones and fiber optic phones can come with electronics that emit biologically significant RFI (RF interference - which can be Incidental or Unintentional, but is still biologically active) and are intolerable to some people with RF sickness. Phone companies need to provide RF filters and DSL filters to people with RF sickness without a hassle. Experience has shown that RF cross-contamination between lines (DSL to non-DSL lines) and between lines and electrical grid RF can be biologically significant so all lines should be equipped with filters. (From a public health perspective, it would be best if these were provided to all customers as a matter of course. All people experience biological effects from RF exposure, but many are either still compensating well enough they are not symptomatic or they simply do not make the connection between exposure and symptoms.) Transportation Most people with RF sickness are unable to use public transportation due to the presence of wireless radiation. Therefore, it is of paramount importance that people with RF sickness have access to stripped-down low RF automobiles. These would be the safest automobiles for everyone, but they are essential for those with RF sickness to retain independent mobility. For more details, please read my attached comment related to cars which was submitted into the TECHNOLOGICAL ADVISORY COUNCIL (TAC) NOISE FLOOR TECHNICAL INQUIRY (ET	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						Docket No. 16-191). Regulatory The FCC Noise Rules urgently need to be updated to prevent new electrical devices, lighting, etc. from being sold and used in the public arena that block access by people with radiofrequency sickness. The existing FCC Noise Rules are solely designed to prevent technological interference. They need to be revised to prevent new electrical devices from being access barriers or from causing a public health threat. For more details, please read my attached comment about the need to update the noise limits which was submitted into the TECHNOLOGICAL ADVISORY COUNCIL (TAC) NOISE FLOOR TECHNICAL INQUIRY (ET Docket No. 16-191).	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 6)		DPEIS Review	Below is a list of accommodations necessary to allow people with radiofrequency sickness to once again participate fully in public and community life. It is divided into two categories - one for transmitted radiofrequency radiation and one for radiofrequency exposure from “dirty” electricity. Transmitted radiofrequency radiation accommodations: • Adopt Salzburg, Austria radiofrequency radiation safety limits until biologically-based populationprotective RF safety limits can be established (1microW/m2 inside and 10microW/m2 outside - lowered as necessary to prevent biological effects because our experience shows that levels should be below 3microW/m2). • Eliminate wireless internet service from public places (including transportation). • Transmitters on wireless devices turned off in public places - detectors should be installed at entrances to remind people.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						• Hospitals only use wired internet, wired in-building networks, and wired devices within the hospital. This would also protect privacy and security. • Cell and broadband antennas situated at a distance from hospitals and residential areas such that cell and broadband antennas situated at a distance from hospitals and residential areas such that Salzburg radiation limits of 1microW/m2 not exceeded inside the hospital or homes. • Medical clinics use only wired in-office network and internet service and devices. "Dirty" electricity radiofrequency accommodations: • Kazakstan "dirty" power standard adopted globally - maximum of 50 G/S units on Stetzerizer meter on building wiring. (www.stetzerelectric.com) • Daylighting should be encouraged. All new lighting installations must be low radiofrequency lighting e.g. properly engineered lighting with very low or no emission of Incidental or Unintentional RF.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 7)		DPEIS Review	They must be included in the Firstnet PEIS. Research findings are sufficiently strong now related to carcinogenicity that former IARC panelists like Dr. Dariusz Leszczynski warn that RF-EMF should be classified as a Group 2A carcinogen, and Dr. Lennart Hardell reports that several studies indicate a Group 1 classification is justified, placing RFEMF in the same category as tobacco, asbestos, and benzene. Dr. Dariusz Leszczynski MSc, DSc, PhD https://betweenrockandhardplace.wordpress.com/2014/08/14/ carcinogenicity-of-cell-phone-radiation-2b-or-not-2b/ "In conclusion, I consider that currently the scientific evidence is sufficient to classify cell phone radiation as a probable human carcinogen – 2A category in IARC scale. Time will show whether 'the probable' will change into 'the certain'. However, it will take tens of years before the issue is really resolved. In the	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						mean time we should implement the Precautionary Principle. There is a serious reason for doing so." Dr. Lennart Hardell MD, PhD http://www.ncbi.nlm.nih.gov/pubmed/24192496 "Based on the Hill criteria, glioma and acoustic neuroma should be considered to be caused by RF-EMF emissions from wireless phones and regarded as carcinogenic to humans, classifying it as group 1 according to the IARC classification. Current guidelines for exposure need to be urgently revised." These opinions are important because these researchers were among the IARC panelists that decided in 2013 only to classify RF radiation as a class 2B carcinogen and now they consider the evidence significant enough to warrant changing the classification to "probably carcinogenic" or even carcinogenic. The U.S. NTP study results have been released since these statements were made, probably further weighting them in the direction of carcinogenicity. These factors should definitely be discussed in the PEIS. They should also have real influence over whether the scope of the FirstNet project should be adjusted. On pages 2-19 to 2-20 serious effects of RF radiation and RF infrastructure are discussed and dismissed in a bizarre manner. Nine studies showing harm to bird populations via a variety of mechanisms are discussed, including reproductive failure. Then two laboratory studies showing reproductive failure in chickens are discussed "Laboratory studies conducted with domestic chicken embryos have shown that emissions at the same frequency and intensity as that used in cellular telephones have appeared to result in death (DiCarlo et al., 2002) (Manville II, A., 2007)."	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqu	Catherine Kleiber (page 7)		DPEIS Review	Then the idea that these studies show that low level RF radiation emissions support the findings in the environmental studies is ridiculed because "given the	Thank you for your review and comments. FirstNet has revised the section on RF

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
		eDec2016.pdf)				controlled nature of the studies and potential exposure differences in the wild, this causation is left to interpretation and extrapolation." This is a case where bird epidemiological findings and bird lab studies are in agreement. Thus, the evidence show that towers affect birds negatively, at least reproductively. This should be given great weight. FirstNet should be adjusting its plans accordingly. RF radiation kills and damages trees. Very little attention is paid to tree studies. This is an egregious oversight. We rely on trees for the very health of our planet. Trees are being killed and damaged across the U.S. and world-wide by RF radiation even without full-scale implementation of either FirstNet or 5G . RF radiation is being implicated as the cause. Several studies show the very serious effects that RF radiation has on the health of trees. Trees are essential to the welfare of the global environment and the continuation of the human race. The convert carbon dioxide into oxygen for us and purify our air. These are essential services. They also cool and provide shade in our cities and countryside. Additionally, they provide important wildlife habitat. Decimation of the Amazon rainforest by direct human actions has been oft-cited as endangering the global environment. FirstNet should not be moving forward with plans to increase RF radiation exposure in urban or rural areas since it will hasten the RF radiation-induced death of our urban and rural forests. We cannot afford additional forest die-off. Large mature trees are being seriously damaged and killed, this damage will take 50 years or more to repair. The references listed below clearly show that RF radiation has detrimental effects on tree health at levels far below the outdated FCC RF radiation limits. • Radiofrequency radiation injures trees around mobile phone base stations https://www.researchgate.net/publication/	emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations • Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations https://www.hindawi.com/journals/ijfr/2010/836278/ • Tree damage in the vicinity of mobile phone base stations http://kompetenzinitiative.net/KIT/wpcontent/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf • The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 7)		DPEIS Review	LED lights can be engineered to this standard, but many are not at this time and therefore emit high amounts of RF. (Additional benefits - LEDs are more energy efficient than fluorescent lighting and do not emit UV thereby allowing greater access for people with lupus.)• Use of tiered lighting instead of dimmer switches (also saves energy).See the Solutions page at www.electricalpollution.com for a more comprehensive list of steps to minimize RF exposure.Supplementary InformationPlease visit (http://apps.fcc.gov/ecfs/comment_search/input?z=iw0f and search proceedings 03-137 and 12-357) to see the over 300 comments from U.S. citizens pleading with the FCC to establish biologically-based safety limits for radiofrequency radiation to replace the existing outdated thermally-based radiofrequency limits.The 1500-page BioInitiative Report on RF/MW health effects was published in 2012. The authors are 29 scientists from ten countries. They reviewed thousands of studies showing interference with	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						chemical processes in the body, implicating RF/MW in a whole spectrum of alarming effects including genetic damage, cancer, immune dysfunction, neurological injury, and infertility. The report can be found at www.bioinitiative.org. For people with radiofrequency sickness, these effects can be immediate and serious.Cardiac arrhythmias can be caused by wireless technology. Recent replicated double blind studies show that a cordless phone base station operating at WiFi frequencies can cause cardiac arrhythmias in susceptible individuals. This short video discusses the cardiac effect that wireless can have- http://www.youtube.com/watch?v=_EI9fZX4iww. View this video http://www.youtube.com/watch?v=sv1E9IXUd6M to see further discussion. You can read the studies at http://www.magdahavas.com/wordpress/wp-content/uploads/2012/01/Havas-HRV-Ramazzini.pdf and http://www.ncbi.nlm.nih.gov/pubmed/23675629#. Obviously, for susceptible people (like those of us with radiofrequency sickness),	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 7)		DPEIS Review	WiFi can make whole buildings inaccessible and unsafe. A recent study in rabbits found that not only did WiFi change heart function parameters, but it dramatically changed the cardiac effects of both dopamine and epinephrine: Saili L, et al. Effects of acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit. Environmental Toxicology and Pharmacology 40 (2015) 600–605. This should be of great concern since WiFi has become ubiquitous in medical settings and may compromise the effectiveness of essential medical interventions, especially for people with radiofrequency sickness. Medical care is considered to be a basic human right, but people with	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						radiofrequency sickness can no longer access it without potentially endangering their lives or at least experiencing severe functional impairment.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 8)		DPEIS Review	The damage to trees is not theoretical. We are seeing it on our farm now. We have seen it in the city for years, but now we are seeing it in the country as well, on a widespread basis. Please see attached file. The damage is becoming serious and widespread. The nation's trees cannot survive continued chronic increases in RF radiation levels such as FirstNet would bring through direct infrastructure-induced increases and increases caused by increased utilization and greater numbers of devices. Please read the following reports which demonstrate that wireless technology is causing serious harm to wildlife: "The Report on Possible Impacts of Communication Towers on Wildlife Including Birds and Bees" commissioned on 30th August 2010 by the Ministry of Environment and Forest, Government of India http://www.moef.nic.in/downloads/public-information/final_mobile_towers_report.pdf "Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem – a review" http://www.biolmedonline.com/Articles/Vol4_4_2012/Vol4_4_202-216_BM-8.pdf Balmori, A. "Electromagnetic pollution from phone masts. Effects on wildlife," Pathophysiology (2009),doi:10.1016/j.pathophys.2009.01.007 http://www.ncbi.nlm.nih.gov/pubmed/19264463 The Supreme Court of India ordered cell towers removed from schools, colleges, hospitals and playgrounds in Rajasthan because of radiation being "hazardous to life." The court's amazing 200+ page decision thoroughly reviews the worldwide evidence that cell towers are harming human beings and	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						wildlife (http://timesofindia.indiatimes.com/city/jaipur/No-mobile-towers-near-schools-hospitalsdirects-Rajasthan-HC/articleshow/17399705.cms). On July 5, 2013 the Supreme Court of India upheld this decision.	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 8)		DPEIS Review	Causal connections between radiofrequency exposure and biological functional impairment. More recent papers look specifically at causality such as Pall ML Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. J Chem Neuroanat. 2015 Aug 20. (http://www.sciencedirect.com/science/article/pii/S0891061815000599). It discusses the causal relationship between exposure to radiation from wireless technology and neuropsychiatric effects. Mechanisms of action are also discussed. Yakymenko et al discuss the fact that RF radiation is documented in numerous studies to cause oxidative damage and discusses mechanisms for bioeffects (Low intensity radiofrequency radiation: a new oxidant for living cells in Oxid Antioxid Med Sci 2014;3(1):1-3) (http://www.sciencedirect.com/science/article/pii/S1382668915300594). This case report documents the serious neurological functional impairment that exposure to radiation from wireless technology can cause. Johansson O and Redmayne M Exacerbation of demyelinating syndrome after exposure to wireless modem with public hotspot Electromagnetic Biolology and Medicine (http://dx.doi.org/10.3109/15368378.2015.1107839). The International Commission on Non-Ionizing Radiation Protection (ICNIRP) sets radiofrequency (RF) exposure limits for Europe that are similar to what the IEEE sets for the U.S. According to	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						ICNIRP, FCC guidelines would not be protective for individuals with sensitivities/impairments from low exposures of RF/MW. It is a scientific fact that even small amounts of these environmental exposures are harmful to some. ICNIRP stated the following:	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 8)		DPEIS Review	"Different groups in a population may have differences in their ability to tolerate a particular NIR (non-ionizing radiation) exposure. For example, children, the elderly, and some chronically ill people might have a lower tolerance for one or more forms of NIR exposure than the rest of the population. Under such circumstances, it may be useful or necessary to develop separate guideline levels for different groups within the general population, but it may be more effective to adjust the guidelines for the general population to include such groups. Some guidelines may still not provide adequate protection for certain sensitive individuals nor for normal individuals exposed concomitantly to other agents, which may exacerbate the effect of the NIR exposure, an example being individuals with photosensitivity." from ICNIRP STATEMENT, GENERAL APPROACH TO PROTECTION AGAINST NON-IONIZING RADIATION PROTECTION, (HEALTH PHYSICS 82(4):540-548; 2002) (https://www.icnirp.org/documents/philosophy.pdf) In light if this statement and all the other evidence, it is time that accessibility guidelines for hospitals, medical facilities, and other essential government buildings prohibit the presence of facility provided WiFi and other wireless transmissions within the facility. Medical records, electronic data, and the internet can be accessed perfectly well (and far more securely) using dedicated communication cables. Our doctors office has used electronic records for years which they accessed using direct cabled	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						connections which they plugged their laptop into upon entering the office. The Threat to Public Health Posed by Wireless Technology Makes Elimination of Wireless from Public Buildings, Hospitals, Medical Facilities, Schools, and Public Places a Very Reasonable Accommodation The following links are of interest in spite of the fact that they relate to public health since they help with understanding that the accommodations needed for people with radiofrequency sickness are actually beneficial for public health. Wireless technology not only restricts accessibility for people with radiofrequency sickness, it jeopardizes public health.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 9)		DPEIS Review	None of these are mentioned in the PEIS. They are of great relevance. The PEIS also did not mention the fact that increasing RF radiation exposure would increase RF radiation-induced functional impairments, violating the rights of those already experiencing serious effects from RF radiation (RF radiation sickness - see http://www.magdahavas.com/wordpress/wpcontent/uploads/2010/08/Dodge_1969.pdf). Furthermore, FirstNet would be in violation of the 2008 ADA Amendments, causing further exclusion from society and greater levels of disability for those already experiencing RF radiation sickness and increasing the numbers of people developing RF radiation sickness since it is caused by chronic over exposure to RF radiation. The only cure for RF radiation sickness is avoiding exposure and the wireless broadband portion of FirstNet would make that virtually impossible. I have attached a comment I made to The National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR) regarding the need for the elimination of wireless from public places, public buildings, and medical facilities.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						Numerous other people also made comments. My comment also has relevance for ensuring that wired FirstNet infrastructure does not cause additional disability by causing "dirty" electricity. I hope that FirstNet will steps to ensure that its systems do not cause "dirty" electricity. As noted on p. 2-12, in 1996 the FCC was given the responsibility to "prescribe and make effective rules regarding the environmental effects of radio frequency emissions" (TCA, 104 Pub. L. 104), obviously it has not done this, as discussed above the rules are outdated and inapplicable. The FCC is in the process of updating them so the common practice of relying on compliance with FCC RF radiation limits as being sufficient for protection of health and the environment must end (see p.2-12). As discussed previously, until the FCC completes revision of the FCC RF radiation limits so that they are population based biologically-protective RF radiation limits the FCC is in violation of their Congressional delegated responsibility to adopt "uniform, consistent requirements, with adequate safeguards of the public health and safety" these were to be "established as soon as possible" (H.R. Report No. 104-204, p. 94). Unfortunately, it appears that the undue industry influence at the FCC documented in a report published by Harvard (http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf), may have compromised the agency's ability to promptly revise its RF radiation safety limits.	
South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 9)		DPEIS Review	The need for biologically-based RF radiation safety limits is supported by the RF/EMF research community. Over 220 scientists have signed an appeal to the UN (www.emfscientist.org). The need for FirstNet to do its own due diligence is supported by case law. In Massachusetts v. E.P.A.,	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed,

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						549 U.S. 497 (2007) Justice Stevens wrote for the majority that agencies cannot ignore Congresses command to regulate. Thus, the fact that FCC has abrogated its duty to maintain protective up-to-date RF radiation limits does not excuse FirstNet from having to consider the serious health and environmental consequences of its program in the PEIS and find a reasonable alternative to protect public health and the environment. In Scenic Hudson Preservation Conference v. Federal Power Commission, 354 F.2d 608 (2d Cir. 1965), cert. denied 384 U.S. 941 (1966), on appeal the Circuit Court pointed out (at p. 620) that Congress gave the FPC a broader responsibility. The Scenic Hudson Court noted “In this case, as in many others, the Commission has claimed to be the representative of the public interest. This role does not permit it to act as an umpire blandly calling balls and strikes for adversaries appearing before it; the right of the public must receive active and affirmative protection at the hands of the Commission.” This decision has obvious applicability to the need for FirstNet to act proactively to protect the health of the American people, as well as the environmental health, not just do a pro forma PEIS without real consideration of the great potential for harm that a portion of the FirstNet program has. Given both the serious inadequacy of the FCC RF radiation limits and the potential for serious harm to public health and the environment that can result if FirstNet implements the program as originally envisioned, FirstNet needs to take steps to amend the program to prevent that harm. Recommended reasonable modifications to FirstNet: FirstNet must inform Congress of the health and environmental hazard posed by the RF radiation emission required for wireless broadband and request Congress to eliminate provision of wireless broadband internet from FirstNet's mission.	independent studies to form the basis of its analysis.

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South	12/16/2016	Attachment 1 (FirstNetDraftPEISCritiqueDec2016.pdf)	Catherine Kleiber (page 9)		DPEIS Review	As discussed earlier in this document, it is now acknowledged by government agencies, particularly the Department of Interior and the Environmental Protection Agency that the FCC RF radiation limits are not protective of the public during the chronic exposures experienced today. Furthermore, the U.S. National Toxicology Program has found that RF radiation damages DNA and causes cancer. These are sufficient reasons to halt the portion of the FirstNet Program aimed at increasing wireless broadband coverage and usage. Increasing wired, cabled, and fiber optic access to broadband could be substituted instead. Thereby, achieving a comparable result without causing public health or environmental problems. For the same reasons, FirstNet should delay implementation of the wireless first responder's component until they design as system that provides good interoperable first responder communication while minimizing radiofrequency emissions from antennas and first responder's communicators. Thus, communicators should be able to contact each other directly, not require an outside antenna (certain types of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed. FirstNet should request that the NTP quickly undertake and complete toxicology studies comparing the different communication technologies, including, but not necessarily limited to, 3G, 4G, and 5G LTE technologies so that FirstNet can utilize the least toxic least biologically active technology for its first responder's interoperable communication system. Oxidative parameters and calcium efflux should be among the measures used. Please make the necessary modifications to all the	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						FirstNet Draft PEIS documents. Please also make the next versions more readily available. You should, for instance, include links to the different sections on your website so they can be readily located and downloaded. Thank you. Sincerely, Catherine Kleiber	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 9)		DPEIS Review	U.S. National Toxicology Program (NTP) recently released findings that the radiation utilized by wireless technology is carcinogenic and breaks DNA. A replicated European study found that wireless radiation is also a cancer growth promoter. This excellent article by the Environmental Health Trust (http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/) provides a good overview of the carcinogenicity findings. International Scientists Appeal to U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology (http://www.EMFscientist.org) "Today 190 scientists from 39 nations submitted an appeal to the United Nations, UN member states and the World Health Organization (WHO) requesting they adopt more protective exposure guidelines for electromagnetic fields (EMF) and wireless technology in the face of increasing evidence of risk. These exposures are a rapidly growing form of environmental pollution worldwide." Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates by Norm Alster. (http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf) A damning report reinforcing the contention of the International Scientist Appeal to the U.N. that regulatory agencies and standard-setting boards are not listening to researchers - read why this is happening in the U.S.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						FCC Not Enforcing Existing Inadequate Radiofrequency Limits A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (http://www.marketwire.com/press-release/-1770139.htm). A Wall Street Journal investigation (http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.	
South	12/16/2016	Attachment 3 (NIDILRRCatharineNov2016.pdf)	Catherine Kleiber (page 9)		DPEIS Review	The International Agency for Research on Cancer (IARC), a committee of the World Health Organization, has classified RF radiation, including that emitted by wireless technology, as a class 2B carcinogen. http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf. "Electromagnetic Radiation, Health and Children 2014" by Dr. Erica Mallery-Blythe (https://www.youtube.com/watch?v=sNFdZVeXw7M) is a must-watch presentation about the hazard that RF radiation emitted by wireless technology poses to children. Dr. Mallery-Blythe does an excellent job of presenting the information in an interesting, coherent, and accessible way, but with enough detail to justify immediate action to minimize children's exposure to radiation from wireless technology. Department of Interior: "the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today." (http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf) RF radiation disrupts the endocrine system:	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						◦ Klaus Buchner and Horst Eger. Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields A Long-term Study under Real-life Conditions. Original study in German: BUCHNER K, EGER H (2011) Umwelt-Medizin-Gesellschaft 24(1): 44-57. http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf	
South	12/16/2016	email	Naveen Albert	Interlinked Project	DPEIS Review	Wired technologies are far more reliable, far more secure, and much faster than wireless technologies. In addition, the electromagnetic radiation emitted by wireless technologies, such as cell phones, cordless phones, smart meters, cell towers, and Wi-Fi, has been declared a Class 2B carcinogen by the World Health Organization. Numerous peer reviewed studies have also found biological health impacts down to very low exposure levels, far below our FCC guidelines which are largely ineffective, I kindly request that Congress eliminate the provision of wireless broadband from the FirstNet mission. At the very least, delay implementation of the wireless First Responder component until a system is designed that minimizes RF emissions from antennas and communicators There are numerous cancer studies with findings regarding first respondents, Please also see this NTP study: http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/ Thus, communicators should be able to contact each other directly, not require an outside antenna (certain types	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed. Here are just a few more studies: The Central Region document is available at the following site: https://www.regulations.gov/document?D=FIRSTNET-2016-0003-0001 The East Region https://www.regulations.gov/document?D=FIRSTNET-2016-0002-0001 The South region is available for review and comment at the following link: https://www.regulations.gov/document?D=FIRSTNET-2016-0005-0001 West Region https://www.regulations.gov/document?D=FIRSTNET-2016-0004-0001 or https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&D=FIRSTNET-2016-0004	
South	12/16/2016	email	Naveen Albert	Interlinked Project	DPEIS Review	"The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer" (http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18) "Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions" (http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						%202011.pdf) "How does long term exposure to base stations and mobile phones affect human hormone profiles?," Eskander et al. http://www.sciencedirect.com/science/article/pii/S0009912011027330 FirstNet wireless technology is supposed to be LTE 4G - much higher RF levels are emitted by 4G technologies than necessary, Remember, in a disaster, wireless technologies fail. Please make sure we keep safe, affordable, reliable corded landline telephone service, and abandon initiatives to do otherwise Do not stand behind FCC regulations. FCC regulations do not protect from "any potential effects," as this letter from Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, regarding the limitations and purpose of the FCC exposure standards notes (http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf) This very credible evidence is unmentioned and ignored. Furthermore FCC regulations are poorly enforced. (An issue which is completely ignored in the PEIS.) Rampant violations are documented by the Wall Street Journal and EMR Policy Institute. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (http://www.marketwire.com/press-release/-1770139.htm). A Wall Street Journal investigation (http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the	

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						thermal range by around the end of 2015. A fully elucidated mechanism should not be required to take action to protect public health when detrimental effects are found. Serious biological effects are acknowledged and then ignored on page 2-20. The two mechanisms that are extremely plausible and well-supported in the literature are completely ignored: Oxidation – 1. Yakymenko, I., Tsybulin, O., Sidorik, E., et al. (2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. Electromagn Biol Med. Jul;7:1-16. http://www.ncbi.nlm.nih.gov/pubmed/26151230# Ca 2+ channels 1. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard Recent Res Devel Mol Cell Biol 7. 2. Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. J Chem Neuroanat DOI: 10.1016/j.jchemneu.2015.08.001. http://dx.doi.org/10.1016/j.jchemneu.2015.08.001 3. Pall, M.L. (2016) 4. Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. The PEIS uses outdated documents to excuse inaction. Contrary to their assertion, FCC limits do not protect	

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						against adverse effects, even the DOI noted "the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today" (http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf) The opening of the FCC docket to re-evaluate limits is acknowledged, but then ignored. The logical step of delaying implementation of the wireless component until that is completed is not even mentioned. The National Toxicology Program findings are not even mentioned. Their exposure calculations are based on only one antenna and work out to 477uW/m2, which is over the level shown to cause biological effects (http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf see graph at end). Most towers or building antenna sites have more than one antenna radiating in any given direction, plus signals come from other nearby sites, and the ground infrastructure such as cellphones, tablets etc. So levels at ground level are likely to be far higher than that and levels in apartments or homes which get a direct hit from neighboring buildings could be far higher depending on distance. Several IARC panelists have made public statements that the evidence now shows that radiofrequency radiation should be classified as either a class 2A or class 1 human carcinogen. The recent (ignored) National Toxicology Program findings support this.	

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						This should cause the wireless portion to be stopped and FirstNet should explain why to Congress, but no mention is made and therefore no such action is recommended. They refuse to take action to protect birds in spite of lab and epidemiological evidence that support each other in finding hard because it requires "interpretation and extrapolation."(2-20) Doesn't it always? They hardly touch on tree damage and totally ignore the following tree and plant studies: • Radiofrequency radiation injures trees around mobile phone base stations: https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations • Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations https://www.hindawi.com/journals/ijfr/2010/836278/ • Review: Weak radiofrequency radiation exposure from mobile phone radiation on plants: http://www.ncbi.nlm.nih.gov/pubmed/27650031?dopt=Abstract • Tree damage in the vicinity of mobile phone base stations: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf • The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf • Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably	

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. -IMPORTANT MECHANISTIC DISCUSSION On 2-20 the PEIS acknowledges "A number of other studies generally touch upon the nature of RF exposure and the disruption of biological processes that are fundamental to plant and animal growth and health, including but not limited to behavior, DNA damage, immune deficiencies, reproductive system effects, hormone dysregulation, degraded cognition and sleep, and desynchronization of neural activity (BioInitiative Working Group, 2012) (Balmori, A., 2005)," but then no protective action is being taken because "The common practice for NEPA documents related to cellular towers is to cite FCC standards and point to the fact that they would be built and operated according to allowable FCC RF emission limits. Some NEPA documents that have more directly addressed the RF emissions potential largely point to the existing literature and suggest that although there is evidence that RF emissions could potentially affect some species, the evidence is insufficient to support a finding of adverse impacts on these species due to RF emissions (Ballistic Missile Defense Organization, 2000) (FCC, 2012)." This approach was not allowable by the courts in other situations. Especially since the inadequacy of the FCC RF limits is now acknowledged by both the DOI and the EPA. In addition, numerous studies have added to the knowledge about the hazard that RF poses to human health since both 2000 and 2012, including the NTP study which has found that RF is carcinogenic and breaks DNA. Please consider the best interests of us and the environment before making a potentially poor choice.	

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						DO THE RIGHT THING (hint: it's not hard!) Naveen Albert	
South	12/16/2016	email	Naveen Albert	Interlinked Project	DPEIS Review	The two mechanisms that are extremely plausible and well-supported in the literature are completely ignored: Oxidation – 1. Yakymenko, I., Tsybulin, O., Sidorik, E., et al. (2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. Electromagn Biol Med. Jul;7:1-16. http://www.ncbi.nlm.nih.gov/pubmed/26151230# Ca 2+ channels 1. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard Recent Res Devel Mol Cell Biol 7. 2. Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. J Chem Neuroanat DOI: 10.1016/j.jchemneu.2015.08.001. http://dx.doi.org/10.1016/j.jchemneu.2015.08.001 3. Pall, M.L. (2016) 4. Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. The PEIS uses outdated documents to excuse inaction. Contrary to their assertion, FCC limits do not protect against adverse effects, even the DOI noted “the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						today" (http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf) The opening of the FCC docket to re-evaluate limits is acknowledged, but then ignored. The logical step of delaying implementation of the wireless component until that is completed is not even mentioned. The National Toxicology Program findings are not even mentioned.	
South	12/16/2016	email	Naveen Albert	Interlinked Project	DPEIS Review	Their exposure calculations are based on only one antenna and work out to 477uW/m2, which is over the level shown to cause biological effects (http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf see graph at end). Most towers or building antenna sites have more than one antenna radiating in any given direction, plus signals come from other nearby sites, and the ground infrastructure such as cellphones, tablets etc. So levels at ground level are likely to be far higher than that and levels in apartments or homes which get a direct hit from neighboring buildings could be far higher depending on distance. Several IARC panelists have made public statements that the evidence now shows that radiofrequency radiation should be classified as either a class 2A or class 1 human carcinogen. The recent (ignored) National Toxicology Program findings support this. This should cause the wireless portion to be stopped and FirstNet should explain why to Congress, but no mention is made and therefore no such action is recommended.	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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South	12/16/2016	email	Naveen Albert	Interlinked Project	DPEIS Review	• The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf • Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. -IMPORTANT MECHANISTIC DISCUSSION	Thank you for your review and comments. FirstNet has revised the section on RF emissions to incorporate new references provided, and has used only peer-reviewed, independent studies to form the basis of its analysis.

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						On 2-20 the PEIS acknowledges "A number of other studies generally touch upon the nature of RF exposure and the disruption of biological processes that are fundamental to plant and animal growth and health, including but not limited to behavior, DNA damage, immune deficiencies, reproductive system effects, hormone dysregulation, degraded cognition and sleep, and desynchronization of neural activity (BioInitiative Working Group, 2012) (Balmori, A., 2005)," but then no protective action is being taken because "The common practice for NEPA documents related to cellular towers is to cite FCC standards and point to the fact that they would be built and operated according to allowable FCC RF emission limits. Some NEPA documents that have more directly addressed the RF emissions potential largely point to the existing literature and suggest that although there is evidence that RF emissions could potentially affect some species, the evidence is insufficient to support a finding of adverse impacts on these species due to RF emissions (Ballistic Missile Defense Organization, 2000) (FCC, 2012)." This approach was not allowable by the courts in other situations. Especially since the inadequacy of the FCC RF limits is now acknowledged by both the DOI and the EPA. In addition, numerous studies have added to the knowledge about the hazard that RF poses to human health since both 2000 and 2012, including the NTP study which has found that RF is carcinogenic and breaks DNA. Please consider the best interests of us and the environment before making a potentially poor choice. DO THE RIGHT THING (hint: it's not hard!) Naveen Albert	

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South	12/21/2016	Letter	Richard A. Hyde	Texas Commmission on Environmental Quality	DPEIS Review	Re: Docket ID: FIRSTNET-2016-0005, Draft Programmatic Environmental Impact Statement for the South Region of the Nationwide Public Safety Broadband Network Dear Ms. Walker: Enclosed please find comments from the Texas Commission on Environmental Quality (TCEQ) regarding the Draft Programmatic Environmental Impact Statement (PEIS) for the South Region of the Nationwide Public Safety Broadband Network. More specifically, our comments relate to Volume 13-Chapter 15. Texas of the draft PEIS. Thank you very much for the opportunity to comment. If there are any questions concerning the comments, please feel free to contact Mr. Minor Hibbs, P.E., Technical Advisor to the Deputy Executive Director at 512/239-6590 or via email at minor.hibbs@tceq.texas.gov.	Thank you for your review and comments.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	p. 15-71: Table 15.1.4-1 last row states that TPDES permits are for regulation of pollutants in stormwater. // TPDES permits regulate point source discharges from industrial and municipal wastewater treatment systems as well as stormwater.	Thank you for your comment, Table 15.1.4-1 has been updated to reflect this revision.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	p. 15-77: Texas Council on Environmental Quality // Texas Commission on Environmental Quality	Thank you for your comment, the text has been updated to reflect this revision.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	p. 15-220: "However, the Texas Commission on Environmental Equity (TCEQ) has established a program to address environmental justice. The goals of the Environmental Equity Program are to: • Support the participation of communities in the regulatory processes; • Serve as point of contact to address environmental injustice allegations;	Thank you for your comment, the text has been updated to reflect this revision.

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						• Serve as a liaison between the community, industries, and the government; and • Consider and respond to environmental equity concerns. (TCEQ, 201Sm) // The correct agency name is Texas Commission on Environmental Quality (TCEQ). The goals of the program are slightly different than those listed in the environmental impact statement. The paper cites the TCEQ website (2015) as the source of the information. Since 2013 the TCEQ website reads as follows: Environmental Equity The TCEQ's program to address environmental justice concerns in low- income and minority communities around the state. Program Overview The goals of the Environmental Equity Program are to: • Help citizens and neighborhood groups participate in regulatory processes; • Serve as the agency contact to address allegations of environmental injustice; • Serve as a link for communications between the community, industries, and the government. • Thoroughlv consider all citizens' concerns and handle them fairly.	
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-242: Section Headings // The main title of 15.1.12.2 is "Specific Regulatory Considerations" but the subheadings make no distinctions to the extent that Title V requirements get blurred with NSR requirements, with SIP information added at the end of the section.	Thank you for your review and comments. Section 15.1.12.2 has been revised for clarity.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-242: One of the criteria pollutants listed is SOx. // The appropriate criteria pollutant is S02 -sulfur dioxide. Additionally, the abbreviation for lead is missing from this sentence (Pb).	Thank you for your comments, the criteria pollutant information has been revised.

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South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-242: The Clean Air Act (CAA) establishes National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: Carbon monoxide (CO), lead, oxides of nitrogen (NOX), particulate matter, (PM2.S and PM10), ozone (03), and oxides of sulfur // The Clean Air Act (CAA) establishes National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: Carbon monoxide (CO), lead (Pb), nitrogen dioxide (N02), particulate matter (PM2.5 and PM10), ozone (03), and sulfur dioxide (S02)..	Thank you for your comments, the criteria pollutant information has been revised.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-242: TCEQ adopted the NAAQS and does not maintain any state-only standards. // TCEQ has not adopted the NAAQS per se, but a predecessor agency, the Texas Air Control Board, did adopt a rule indicating that the NAAQS would be enforced in Texas. 30 TAC§ 101.21. TCEQ has developed and adopted selected state standards for pollutants for which there are NAAQS, but the state standards are unrelated to the NAAQS. See, for example, Chapter 111 for selected standards for particulate matter.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-242: Texas has authorization to issue CAA Title V operating permits on behalf of the USEP A, as outlined in 40 CFR 70. // Texas has delegated authority to issue CAA Title V operating permits on behalf of the USEP A, as outlined in 40 CFR Part 70.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-242: The NAAQS establish various standards, either primary or secondary .. // The EPA establishes the NAAQS. There are both primary and secondary NAAQS for each criteria pollutant.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-242: In addition to the NAAQS, there are standards for hazardous air pollutants (HAP), which are those typically associated with specific industrial processes such as chromium electroplating (hexavalent chromium), dry cleaning (perchloroethylene), and solvent degreasing	Thank you for your review and comments. The text has been revised for clarity, per your comment.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						(halogenated solvents (USEPA, 2016c). // The regulation of hazardous air pollutants (HAPs) is not coded in Title 30 of the Texas Administrative Code (TAC) beyond the scope of federal regulations. The TCEQ reviews the emissions of HAPs by agency-generated, chemical-specific screening levels called effects screening levels (ESLs) or air monitoring comparison values (AMCVs). The ESLs are utilized to evaluation of emissions, reflected in modeling exercises, during the air permits process. The intention of ES Ls is to provide a screening level that functions as a trigger to perform an in-depth evaluation of predicted chemical concentrations and industrial activities when this level is exceeded. The intention of ESLs is to prevent industrial emissions from becoming a threat to human health and welfare. Similarly, the TCEQ uses AMCVs to evaluate ambient chemical concentrations observed:bY fixed-site or mobile monitoring equipment. Like an ESL, the exceedance of an AMCV does not immediately induce the agency to engage in enforcement actions. It does, however, induce an evaluation of the AMCV exceedance to determine whether observed chemical concentrations are of concern to human health or welfare. In some cases, AMCV exceedances may ultimately lead the agency to pursue corrective action to reduce chemica) emissions causal of the AMCV exceedance. Descriptions of these screening levels and guidelines detailing the manner in which they are developeci are available at the following url: https://www.tceq.texas.gov/toxicology A list of the HAPs potenti,ally regulated in various programs at the TCEQ are available at the following url: https://www.tc□q.t□xas.gov/assets/pu blic/permitting/air /Forms/N ewSour ceReview /Tables/2Q169□tbl.pdf	

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South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-243: TAC Title 30.122 (Federal Operating Permits Program) describes the applicability of Title V operating permits (Office of the Secretary of State, 2015). // The citation form is incorrect- it should be 30 TAC Chapter 122, Federal Operating Permits Program, which references Title 30, Texas Administrative Code, Chapter 122. The rule citation form throughout this section is incorrect. The legal citation for the Administrative Code is [title] TEX. AD MIN. CODE [rule]. So, for example, the citation for Title V applicability is 30 TEX. ADMIN. CODE§ 122.122. However, over time, this agency has adopted the short-hand citation of TAC - 30 TAC§ 122.122.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-243: Texas requires Title V operating permits for any major source if it emits or has the potential to emit pollutants in excess of the major source thresholds (Table 15.1.12-1).// There are additional applicability criteria - not just major source threshold criteria. See, 30 TAC §122.120. Generally, major sources, sources subject to the acid rain program, or. non-major sources that EPA has identified as subject to the Title V program are required to have Title V operating permits	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-243: In addition to Title V operating permits, the TCEQ issues general operating permits under TAC Title 30.122.501 (General Operating Permits) for minor, stationary sources. // Again, correct citation form is 30 TAC §122.501. Also, general operating permits are a type of Title V operating permit, not necessarily for minor stationary sources [only for those non-majors that are subject to the Title V program.) General oper□ting permits provide a streamlined application and permitting process for si□es that are similar in operations, emission units and applicable requirements. The State of Texas has two air permit programs: New Source Review (NSR)	Thank you for your review and comments. The text has been revised for clarity, per your comment.

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						(preconstruction authorization), and the Title V operating pen:nit program (federal operating permit). Each permit program serves a different purpose. Any person who plans to construct any new facility or engage in the modification of any existing facility which emits air contaminants into the atmosphere is required to obtain authorization prior to construction pursuant to 30 TAC Section 116.110. Additionally, major sources and some non-major sources are required to obtain authorization to operate under the Title V program.	
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-243: General operating permits are evaluated case-by- case by TCEQ due to the varying nature of the facilities. // This is incorrect. See note above. Some NSR preconstruction permits are evaluated case-by-case; others are not. TCEQ also has adopted NSR permits by rule, and standard permits that can be utilized without case-by-case review bv TCEO permitting staff.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-243: TCEQ also issues permits by rule under TAC Title 30.106 (Permits By Rule) for minor sources that will not emit a significant amount of pollutants into the atmosphere if regulated under this permit. TCEQ may issue a permit by rule for facilities that do not exceed the following limits: • 250 tpy of CO or NOx; • 25 tpy of VO Cs, S02 , or inhalable PM; • 15 tpy of PMlO; or • 10 tov of PM2.5.// Citation should be: 30 TAC Chapter 106 Also, the list of pollutants leaves off: (E) 25 tpy of any other air contaminant except: (i) water, nitrogen, ethane, hydrogen, and oxygen; and (ii) notwithstanding any provision in any specific permit by rule to the contrary, greenhouse gases as defined in §101.1 of this title (relating to Definitions)."	Thank you for your review and comments. The text has been revised for clarity, per your comment.

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South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-243: Section titled "Exempt Activities" // The purpose of this section is unclear. The Texas Clean Air Act does not provide for exemptions and TCEQ does not have authority to provide exemptions. TCEQ does not exempt minor sources from obtaining a Title V operating permit, rather,· the sources are not subject to Title V.	Thank you for your review and comments. This section is has been included in all states, for those states where it is not applicable because a state entity does not provide for any exemptions, as is the case in Texas, the section states that and refers to any requirements (federal or state) that do exist. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-243: Texas can issue temporary permits for major sources located at a site for less than six months that do not affect the determination of major source requirement for other stationary sources located at other sites. Texas can also issue temporary permits for sources that require revisions to a preexisting permit at the site. TAC Title 30.122.204 (Temporary Sources) "a single permit may be issued authorizing similar operations by the same temporary source at multiple temporary locations." (Office of the Secretary of State, 2015) // Again, the correct citation is 30 TAC §122.204 for Title V operating permit temporary permits. These are different from NSR preconstruction permits. There is no authority in the Texas Clean Air Act for issuing temporary case-by-case permits; the only formal temporary NSR authorizations standard permits to authorize temporary facilities.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-244: Paragraph heading "State Preconstruction Permits". TAC Title 30.116.110 (Applicability) requires any person planning to construct a new facility that has the potential to emit air contaminants to obtain a state air permit, also referred to as a New Source Review permit, under TAC Title 30.116.111	Thank you for your review and comments. The text has been revised for clarity, per your comment.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						(General Application). // Heading should be revised to "New Source Review Preconstruction Permits" Correct citation form is: 30 TAC §116.110. There is no such thing as a "state air permit." See note abQve for discussion regarding the permitting programs (Permits). These are both federally required air quality permit programs. Additionally, preconstruction permits required for new construction or modifications at existing facilities. The correct language from the rule (with some editing) is: Before any actual work is begun on the facility, any person who plans to construct any new facility or to engage in the modification of any existing facility which may emit air contaminants into the air of this state shall either: obtain a permit under §116.111; satisfy the conditions for a standard permit; satisfy the conditions for a flexible permit; satisfy the conditions for a PBR; or satisfy the criteria for a de minimis facility or source.	
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-244: New Source Review Permits are evaluated case-bycase by TCEQ due to the varying nature of the facilities. // Not all NSR authorizations are evaluated case-by-case. There is case-by-case NSR review. See note above.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-244: If the new facility does not obtain a state air permit, TAC Title 30.116.110(a)(2) requires the facility to satisfy the conditions for a standard air permit. // There is no such thing as a "state air permit." NSR is a federally required program for both major NSR and minor NSR for non-major sources. See text of 30 TAC §116.1,lO(a) above. If a proposed new facility or modification of an existing facility has the potential to emit air contaminants, those air contaminants must be authorized - the authorization form can be something other than case-by-case or standard permit as provided in the rule.	Thank you for your review and comments. The text has been revised for clarity, per your comment.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-244: Standard air permits are evaluated case-by case by TCEQ (Office of the Secretary of State, 2015). // This statement is not incorrect, but it is way oversimplified. It should just be deleted. A possible substitute: Where required, registrations for standard permits are reviewed for compliance with the terms and conditions of the standard permit.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	General conformity - discussion is generally ok, but some discussion is not completely accurate, e.g., "As a result, lower de mini mis thresholds for VO Cs and NOX could apply depending on the attainment status of a county." Pursuant to Title 40 CFR 93.153(d)(2) and (e), Federal actions "in response to emergencies which are typically commenced on the order of hours or days after the emergency" and actions "which are part of part of a continuing response to emergency or disaster" that are taken up to 6 months after beginning response activities, will be exempt from any conformity determinations (USGPO, 2010) // Agree that there are lots of exemptions and "proposed to conform" actions that are not included here. It leads the reader to infer that the project partners are suggesting that this action could qualify as exempt. However, the action would not be undertaken in direct response to an emergency situation. Implementation of emergency messaging system infrastructure would not in itself be considered an emergency, and unless there is another exemption, would be subject to general conformity in nonattainment and maintenance counties. Tne statement is not inaccurate, but it could be misleading. ; <«««« Would revise this paragraph to: For Federal actions in areas subject to general conformity requirements, nonattainment and maintenance areas, a conformity determinatio□ is required for each criteria	Thank you for your review and comments. The text has been revised for clarity.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						pollutant or precursor where the total direct anμ indirect emissions of that pollutant caused by the Federal action would equal or exceed established de minimis levels. De minimis levels for pollut□nts may be based on designation, classification, or proximity to ozone transport region.	
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-244: . (1) "If an action does not result in an emissions increase above the de minimis levels ... " (2) "If the applicability analysis shows that the total direct and indirect emissions are above the de minimis levels ... // (1) Change to "estimated emissions at or above" 2) Change to "at or above."	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-245: Table of de minimis levels for general conformity // Table is incomplete - does not reference levels for ozone inside OTR areas.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-245: Texas' SIP is a conglomeration of separate actions taken for each of the pollutants.// The Texas SIP also contains additional provisions relating to legal authority, enforcement, and other administrative provisions.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-245: The USEPA classifies areas as attainment, nonattainment, maintenance, or ... // Areas are designated atta_inment, nonattainment, or unclassifiable. Nonattainment areas are.classified as "maintenance areas" after coming into attainment after a nonattainment designation. Maintenance needs to be removed from the list.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-245: When evaluating an area's air quality against regulatory thresholds (i.e., permitting and general conformity), maintenance areas are often combined with nonattainment, while unclassifiable areas are combined with attainment areas // This sentence is unclear, not sure what point is being made here. For permitting, it is the reverse - we are looking at	Thank you for your review and comments. Since maintenance areas are those that were previously in nonattainment, for purposes of discussion, they are grouped with nonattainment areas.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						whether emissions above a regulatory threshold would impact air quality (cause or contribute to an exceedance of a NAAQS).	
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-246: Table 15.1.12-3 The table indicates "Collin County- Lead nonattainment unclassified" Some nuances are not reflected in this table; for example that there are both annual and 24-hour PM2.5 NAAQS; and 2012 PM2.5 NAAQS not reflected at all. Additionally, the table reflects NOx, not N02, and only reflects 1971 NOx, not 1971 N02 and 2010 N02. Refers to the 1979 lead NAAQS. // Collin County is a lead nonattainment area. Unclassified should not be included. Suggest text should reference official list of designations and classifications, found at 40 Code of Federal Regulations §81.344. Lead NAAQS should be 1978 and 2008	Thank you for your review and comments. The EPA Green Book, which is the source for this table, states that Collin County is in nonattainment for lead, however it does not classify the severity of the status (extreme, moderate, marginal, etc.). Therefore "unclassified" is an accurate representation of its nonattainment status.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-246: Additionally, given that particulate matter is the crit□ria pollutant of concern, PMlO and PM2.5 merge in the figure to count as a single oollutant. // The purpose for this statement is unclear, since EPA has adopted NAAQS for two different classes of particulate matter, PMlO and PM2.5, areas are designated seoaratelv for both of these NAAQS.	Thank you for your review and comments. The text is intended to convey that the class of particulate matter as a whole, inclusive of both PM2.5 and PM10, is represented as a single entity in Figure 15.1.12 1 for purposes of counting the number of different NAAQS for which a given area is in nonattainment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-248: TCEQ measures air pollutants at over 20 sites across the state as part of the National Air Monitoring Stations Network and State and Local Air Monitoring Stations Network (TCEQ, 2015n). // TCEQ measures regulatory compliance for criteria air pollutants at over 100 sites across the state. All TCEQ monitors	Thank you for your review and comments. The text has been revised for clarity, per your comment.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						measuring regulatory compliance are classified as SLAMS or Special Purpose monitors.	
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-248: Annual Texas State Ambient Air Quality Reports are prepared, containing pollutant data summarized by region (TCEQ, 20150). // The TCEQ does not prepare an annual state ambient air quality report containing monitoring data summarized by region.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-248: Throughout 2014, Q3 measurements exceeded the federal standard of 0.075 ppm at 36 locations in Texas with the following maximum values listed in Table 15.1.12-4. // Compliance with the federal 8-hour ozone standard is based on a 3-year average of the fourth highest ozone measurement and not max exceedances. Data from 13 of the 36 ozone monitoring locations listed in Table 15.1.12-4 are not submitted to EPA for use in determining regulatory compliance with the federal 8-hour ozone standard.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-248: Table 15.1.12-4 Texas 2014 Max Exceedances Source: (TCEQ, 2013) // How could TCEQ have done a table in 2013 with max exceedances in 2014? The table also lists the max exceedances in ppm but if that were the case it would be 0.095 and not 95. 95 would be ppb (parts per billion).Cleburne Airport was listed twice so one occurrence was removed. In the text of the document it references "36 locations" which will need to be changed to "35 locations" since the Cleburne Airport location was counted twice.	Thank you for your review and comments. The website states that it was last updated in 2013, however the date in the citation has been changed to acknowledge the more recent data. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-248: Table 15.1.12-4 The UH WG Jones Forest,: Mustang Bayou, Katy Park, UH West Liberty, Danciger, Wallisville Road, UH Moody Tower, Heritage Middle School, City of Garden Ridge, CPS Pecan Valley, SETRPC Mauriceville 42, Holly Road, and Cuero ozone monitors are not used for regulatory compliance purposes.	Thank you for your review and comments. The text has been revised for clarity, to indicate that the locations listed are those where TCEQ monitors air quality, but that they may not all necessarily

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
							be used for compliance determination purposes.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-256: Texas has not established goals and regulations to reduce GHG emissions to combat climate change. // The TCEQ has developed.a GHG PSD permitting program.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-264: Table 15.1.15-1 Reference to regulations incomplete // Add 30 TAC 330, 30 TAC 350	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-270: Second Paragraph. "Permitted discharge facilities are potential sources of toxic constituents that are harmful to human health or the environment". // "Permitted discharge facUities that do not comply with environmental regulations and violate their permit requirements have the potential to imoact environmental auality".	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-313: Second paragraph states that all Gulf Coast Shoreline waters are impaired. // Some portions of the mid.die and upper Gulf Coast Shoreline are impaired.(not all these waters are impaired)	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-313: Second paragraph states that there are fish consumption advisories for all Texas coastal waters. // There are fish consumption advisories in some coastal waters near areas of oooulation concentrations.	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-326: Last paragraph. Mission-Aransas Reserve is mentioned as one of the rare or ecologically significant wetland types requiring special consideration. // Remove Mission-Aransas Reserve from the list in this paragraph. Mission-Aransas Reserve is not one of the types of rare and	Thank you for your review and comments. The text has been revised for clarity, per your comment.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						ecologically significant wetlands recognized by TCEQ.	
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-443: The majority of the counties in Texas are designated as maintenance areas for one or more of the following pollutants: PM, S02, and ozone (Table 15.1.12-5) // This statement is not correct. Most counties are designated attainment in Texas. Recommend deleting that sentence. We also note that the reference to Table 15.1.12-5 is incorrect and should be Table 15.1.12-3.	Thank you for your review and comments. The text has been deleted, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-477: "Prior to the start of any FirstNet deployment project, potential site locations should be screened for known environmental contamination and/or mining activities using federal resources such as the USEPA Cleanups in My Community October 2016 15-4 77 Draft Programmatic Environmental Impact Statement Chapter 15 FirstNet Nationwide Public Safety Broadband Network Texas database and U.S. Department of Interior's Abandoned Mine Lands inventory, through the TXDSHS, or through an equivalent commercial resource." // This discussion appears to ignore the fact that the TCEQ has operates a number of state only programs to identify and remediate contaminated properties. It is recommended that this sentence also add reference to TCEQ databases and its website (www.tceq.texas.gov).	Thank you for your review and comments. The text has been revised for clarity, per your comment.
South	12/21/2016	Letter		Texas Commmission on Environmental Quality	DPEIS Review	15-486: Table A-1 appears to list Terrestrial Communities of Concern that are not in Texas. At a minimum, the counties listed are not in Texas. // Correct the table.	Thank you for your review and comments. The table has been revised.
Cross-Cutting Comments Received in Other Regions							
Central	10/17/2016	Written	Michaela Noble	USDOI	DPEIS Review	The Department of the Interior (Department) has reviewed the Draft Programmatic Environmental Impact Statement (DP EIS) for the Central Region of	Thank you for your comments. FirstNet will continue outreach to

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						the Nationwide Public Safety Broadband Network (NPSBN), i.e., the Proposed Action. The Proposed Action may impact listed species and migratory birds. Because the DPEIS does not include specific locations or impacts, it is not possible to assess those impacts at this time. The Department recommends that FirstNet consult with the U.S. Fish and Wildlife Service (USFWS) when planning specific clearing and construction projects. The Department offers the following comments from the USFWS Field Offices in Wyoming and Minnesota. The Proposed Action includes the potential construction of new wireless communication towers and/or modification of existing towers. The placement and operation of towers can affect migratory birds directly through injury, crippling loss, and death from collisions with towers and their supporting guy-wire infrastructure, as well as indirectly through habitat destruction or degradation due to vegetation clearing and tower construction. Additionally, communication towers might have an impact on migratory birds due to non-ionizing electromagnetic radiation emitted by the tower. Please review the February 7, 2014, letter from the Department to Mr. Eli Veenendaal (National Telecommunications and Information Administration) for additional information regarding electromagnetic radiation impacts for the Proposed Action (Enclosure 1). The DPEIS notes that "If proposed project sites are unable to avoid sensitive areas, best management practices (BMPs) and mitigation measures as defined through consultation with the appropriate resource agency, would be implemented." (Page 29, Executive Summary). The Department supports the DPEIS's	stakeholders beyond the preliminary programmatic stage as site specific locations are determined. FirstNet reviewed the referenced letter regarding electromagnetic radiation and has made modifications to Section 2.4. Thank you for affirming the inclusion of the BMPs intended to reduce impacts to migratory birds.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						BMPs to minimize potential impacts to migratory birds, including:	
Central	10/17/2016	Written	Michaela Noble	USDOI	DPEIS Review	• Engage in early consultation with appropriate agencies and stakeholders as necessary, including but not limited to USFWS, NMFS (National Marine Fisheries Service), and other relevant Federal or state agencies; • Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) (APLIC and USFWS, 2005) for any aboveground lines or cables (e.g., use of diverters); • Implement seasonal and spatial buffer zones around sensitive areas for deployment and maintenance activities, where possible, as recommended by USFWS and state wildlife and natural resources agencies; • Implement the National Bald Eagle Management Guidelines (USFWS, 2007); • Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practical; • Avoid Important Bird Areas (IBAs) and other known important bird habitats to the maximum extent practicable; • Follow guidelines outlined by USFWS for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS, 2013); • Avoid activities within migratory bird flyways and in the immediate vicinity of bat roosts to the extent practicable. The Department emphasizes that USFWS Interim Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS 2013,	Thank you for affirming the inclusion of the BMPs intended to reduce impacts to migratory birds. FirstNet has reviewed the BMPs and Mitigation Measures chapter to confirm that the lighting and marking requirements mentioned here are included.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						https://www.fws.gov/migratorybirds/pdf/management/usfwscommunicationtowerguidance.pdf.) recommend unguyed and unlit towers when practicable to reduce bird collisions, injuries, and mortalities. Recent Department of Transportation (DOT) Federal Aviation Administration (FAA) modifications to obstruction marking and lighting requirements include new configurations that feature flashing lights and which are likely to result in a significant decrease in bird fatalities. (see FAA Advisory Circular, December 4, 2015, http://www.faa.gov/documentLibrary/media/Advisory Circular/ AC 70 7 460-1 L .pdf.).	
Central	10/17/2016	Written	Michaela Noble	USDOI	DPEIS Review	With regards to the BMP to "avoid activities within migratory bird flyways" to the extent practicable, the USFWS believes that migrants concentrate along coastlines of major waterbodies such as the oceans and Great Lakes (Bowden et al. 2015), Rathbun et al. 2016, Diehl et al. 2003, Ewert et al. 2011, Peterson et al. 2015, Buler and Dawson 2012, France et al. 2012). The Department would prefer that communication towers be constructed (in order of USFWS preference): With regards to the BMP to "avoid activities within migratory bird flyways" to the extent practicable, the USFWS believes that migrants concentrate along coastlines of major waterbodies such as the oceans and Great Lakes (Bowden et al. 2015), Rathbun et al. 2016, Diehl et al. 2003, Ewert et al. 2011, Peterson et al. 2015, Buler and Dawson 2012, France et al. 2012). The Department would prefer that communication towers be constructed (in order of USFWS preference): With regards to the BMP to "avoid activities within migratory bird flyways" to the extent practicable, the USFWS believes that migrants concentrate along coastlines of major waterbodies such as the oceans and Great Lakes (Bowden et al. 2015), Rathbun et al. 2016,	FirstNet has revised Chapter 19 to include the USFWS order of preference for communication tower construction location and river corridor migration and stopover sites.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Diehl et al. 2003, Ewert et al. 2011, Peterson et al. 2015, Buler and Dawson 2012, France et al. 2012). The Department would prefer that communication towers be constructed (in order of USFWS preference): 1. More than three miles from any ocean or Great Lake shoreline. 2. If towers are closer than three miles to the shoreline, there should be: site-specific studies and self-standing (un-guyed) towers that are short enough to not require lighting. 3. If towers are closer than three miles to the shoreline and sufficiently tall to require lighting, there should be: site-specific studies; self-standing (un-guyed) towers with lighting that does not include steady-burning lights.	
Central	10/17/2016	Written	Michaela Noble	USDOI	DPEIS Review	Major north/south river corridors are also major migration corridors and stopover sites. Setback distances from these rivers will depend, to some extent, upon habitat conditions and topography. However, these areas should be avoided to the greatest extent possible. FirstNet should generally follow both the USFWS (2013) Guidelines and those stated above for shorelines. Under Executive Order (E.O.) 13186, the USFWS is encouraged to "restore and enhance the habitat of migratory birds, as practicable" and "prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable". The USFWS therefore considers impacts to habitat for migratory birds when providing comments and recommendations under the National Environmental Policy Act (NEPA) environmental review process. The USFWS supports the following	FirstNet has revised Chapter 19 to include the USFWS order of preference for communication tower construction location and river corridor migration and stopover sites.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						DPEIS's BMPs to minimize vegetation and habitat disturbance and loss: • Follow all applicable Federal, state, and local requirements for vegetation removal, disturbance, and restoration; • Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, (f practicable; • Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce vegetation loss; • Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles before moving from one deployment site to another; • Minimize land clearing and vegetation disturbance by using existing roads and unvegetated areas, when feasible, during deployment activities; and • Minimize or avoid removal of forest vegetation whenever possible.	
Central	10/17/2016	Written	Michaela Noble	USDOI	DPEIS Review	In accordance with the goals of E.O. 13186 and the Endangered Species Act (ESA), the USFWS recommends that impacts to migratory birds and listed species be mitigated to the greatest extent practicable. The Department uses the NEPA definition of mitigation (https://ceq.doe.gov/nepa/regs/ceq/1508.htm# 1508.20) which includes avoidance and minimization of impacts, restoring the affected environment, reducing impacts over time, and compensating for impacts by replacing or providing substitute resources or environments. Additionally, the USFWS recommends conducting vegetation removal and tree clearing outside the breeding period for migratory birds. The USFWS Field Offices can provide state-specific date ranges when clearing should be avoided.	Chapter 19 has been modified to include USFWS recommendations for additional BMPs and mitigation measures. The PEISs were written at a very high level and did not contain site specific information. The affect determinations were based on a potential regional affect and do not reflect potential site specific impacts. Site specific locations will be evaluated for potential impacts to T&E species and migratory birds as

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						The DPEIS contained only minimal information regarding the location and habitat types expected to be affected within the project area even though vegetation clearing is likely in the development of the network. The USFWS therefore cannot thoroughly review the expected impacts to species listed under ESA (listed species) at this time. Without additional information, it is impossible to accurately assess the project's potential effects. The Department disagrees with the statements made in Table ES5-7 of the Executive Summary, and any supporting statements in the DPEIS, that for the broad categories shown the project, "May affect, not likely to adversely affect". Until specific potential sites and activities are identified, USFWS believes that these conclusions are premature.	appropriate, and FirstNet and/or its partner would initiate consultation and would adhere to the requirements of consultation with USFWS, and would make every effort to bring the level of impacts below an adverse effect at the site-specific level.
Central	10/17/2016	Written	Michaela Noble	USDOI	DPEIS Review	The Department recommends that FirstNet consult with USFWS field offices when planning specific clearing and construction projects. The USFWS also recommends visiting the USFWS's Midwest Region's Endangered Species Act Section 7 Technical Assistance website (https://www.fws.gov/midwest/endangered/section7/s7) regarding impacts in Minnesota, Iowa, Missouri, Wisconsin, Illinois, Indiana, Michigan, and Ohio. Guidance is available at this website to assist you in fulfilling the requirements for consultation under section 7 of the Endangered Species Act, including a step-by-step explanation of the section 7 process, species distribution lists, species life history information and examples of typical letters. For impacts in Montana, North Dakota, South Dakota, Wyoming, Nebraska, Utah, Colorado, and Kansas, use the USFWS's Mountain-Prairie Region Ecological USFWSs website (https://www.fws.gov/mountain-prairie/es/index.php).	Thank you for your comments. This information was very helpful.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						If, after reviewing the technical assistance websites, it is determined that additional information from a biologist is necessary to assist in the consultation process, please contact the appropriate USFWS field office for the st□te affected. The Cheyenne, WY Field Office and Bloomington, IN Field Office of the USFWS have included more detailed comments regarding the DPEIS and impacts of the Proposed Action on listed species and migratory birds in their states (Enclosure 2). The Department appreciates the opportunity to participate in the environmental review of the Proposed Action. For issues regarding Minnesota, Iowa, Missouri, Wisconsin, Illinois, Indiana, Michigan, and Ohio, Service Field Office contact information can be found at: https://www.fws.gov/midwest/es/fld off.html. For issues regarding Montana, North Dakota, South Dakota, Wyoming, Nebraska, Utah, Colorado, and Kansas, USFWS Field Office contact information can be found by selecting the "Field Offices" tab at https://www.fws.gov/mountainprairie/es/index.php. Enclosure 1: Letter from Willie Taylor (Director, OEPC) to Eli Veenendaal (NTIA, U.S. Department of Commerce) Enclosure 2: Table containing Specific comments from Cheyenne, WY Field Office and Specific comments from Bloomington, IN Field Office	
Central	10/17/2016	Written	Michaela Noble	USDOI	DPEIS Review	Literature Cited Bowden, T. S., E. C. Olson, N. A. Rathbun, D. C. Nolfi, R. L. Horton, D. J. Larson, and J. C. Gosse. 2015. Great Lakes Avian Radar Technical Report Huron and Oceana Counties, Michigan Fall 2011. U.S. Department of lnterior, Fish and Wildlife	Thank you for the references.

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Service, Biological Technical Publication FWS/BTP-2015. Buler, J. J., and D. K. Dawson. 2012. Radar analysis of fall bird migration stopover sites in the Northeast U.S. Final Report. Cooperative Agreement USGS and University of Delaware. Diehl, R. H., R. P. Larkin, and J. E. Black. 2003. Radar observations of bird migration over the Great Lakes. Auk 120:278-290. Ewert, D. N., M. J. Hamas, R. J. Smith, M. E. Dallman, and S. W. Jorgensen. 2011. Distribution of migratory landbirds along the northern Lake Huron shoreline. Wilson Journal of Ornithology 123:536-547. France, K. E., M. Burger, T. G. Howard, M. D. Schlesinger, K. A. Perkins, M. MacNeil, D. Klein, and D. N. Ewert. 2012. Final report for Lake Ontario Migratory Bird Stopover Project. Prepared by The Nature Conservancy for the New York State Department of Environmental Conservation, in fulfillment of a grant from the New York Great Lakes Protection Fund (C303907). Peterson, A. C., Niemi, G. J. and Johnson, D. H. 2015, Patterns in diurnal airspace use by migratory landbirds along an ecological barrier. Ecological Applications, 25: 673-684. doi: 10.1890/14-0277.1 Rathbun N. A., T. S. Bowden, R. L. Horton, D. C. Nolfi, E. C. Olson, D. J. Larson, and J. C. Gosse. 2016. Great Lakes Avian Radar Technical Report; Niagara, Genesee, Wayne, and Jefferson Counties, New York; Spring 2013. U.S. Department of Interior,	

Region	Date Rec'd	Format	Name	Organization	Topic	Comment	Response
						Fish and Wildlife Service, Biological Technical Publication FWS/BTP-3012-2016.	
Central	10/17/2016	Written	Michaela Noble	USDOI	DPEIS Review	Enclosure 1: Letter from Willie Taylor (Director, OEPC) to Eli Veenendaal (National Telecommunications and Information Administration, U.S. Department of Commerce)	Thank you including the letter in your submission.
South	Various	Email	Naveen Albert, Michelle Illiatovitch, Catherine Kleiber, Tara Schell, Rebecca Smith	Various	DPEIS Review	Comments from these submittals express concerns about the potential impacts of radio frequency radiation to wildlife and humans. The full comment submissions can be found in Appendix G of the Final PEIS.	Thank you for your comments and references provided. Potential radio frequency exposure impacts to humans are discussed in Section 2.4, Radio Frequency Emissions, which has been updated to include additional peer-reviewed studies and data.

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APPENDIX G – COMMENTS RECEIVED

Radio Frequency Emissions Comments Received – All Regions

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Comments from Albert M. Manville, II, Ph.D., C.W.B.

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Re: **National Telecommunications Information Administration's (NTIA) First Responder Network (FirstNet) Draft Programmatic Environmental Impact Statement (DPEIS) for the Western United States**

Comments to be submitted in their entirety for the Administrative

Record. Submitted by Albert M. Manville, II, Ph.D., C.W.B.

Principal, *Wildlife and Habitat Conservation Solutions, LLC*[1];
Adjunct Professor, Krieger School of Arts and Sciences, Advanced Academic Programs, Johns Hopkins University, Washington DC campus; and
former U.S. Fish and Wildlife Service agency lead on avian-structural impacts — including from collision and radiation impacts to migratory birds from communication towers

September 29, 2016 [FirstNet DPEIS W.U.S. Comments-AMM.docx]

Introduction

I am pleased to provide comments regarding FirstNet's DPEIS for the Western United States. Please con- sider my comments regarding this DPEIS for the Western United States as representative of national and continental needs and concerns regarding both wildlife and the impacts from communication towers and their radiation. My comments and recommendations are focused on new wireless communication towers which FirstNet will contract to be built and make operational.

Overview of my Assessment

Below I provide more details not discussed in Chapter 2 about migratory birds, their status and importance.

I recommend — based on DPEIS Chapter 9, Best Management Practices (BMPs) — even stronger se- lection criteria for new towers, purposely avoiding — as practical and feasible — tower siting and operation in heavily human developed areas and wildlife concentration areas, especially for migratory birds.

I make a strong evidentiary case— in reviewing DPEIS Chapter 2 — based on the most recent peer- reviewed scientific literature and professional contacts, that the effects on non-thermal radiation must be included in FirstNet's National Environmental Policy Act (NEPA) review, based on a 2014 agreement with the Department of Interior. Furthermore, I argue that, "*the potential effects of major concern are rare…"* (p. 2-12) is an inaccurate conclusion based on the preponderance of recent new evidence and cumulative database effects.

I will show that independent studies from radiation effects should be supported by FirstNet to develop consistent, standardized, agreed-upon radiation metrics, based on peer-reviewed monitoring and testing research protocols. While arguably we have, *"no consistent measures of*

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exposure…" (p. 2-12), FirstNet has an opportunity to lead in establishing them.

I will show that independent scientific research supported by FirstNet could help develop and set exposure guidelines for radio frequency radiation (RFR) effects on wildlife, especially migratory birds, as well as on humans. I assert that the statement, "[we have] *no scientifically agreed upon biological mechanism of harm*…" (p. 2-12) is an incorrect one based on the current scientific evidence, and further that the communications industry continues to spend enormous amounts of money fighting current biological conclusions and recommendations

Qualifications

My expertise in wildlife, including migratory birds, and impacts from radiation is extensive. I earned a B.S. in zoology from Allegheny College, an M.S. in natural resources and wildlife management from the University of Wisconsin, Stevens Point, and a Ph.D. from Michigan State University in wildlife ecology and management. More recently, I was designated as a "Certified Wildlife Biologist" (C.W.B.) by The Wildlife Society. During my military service, I was trained by the U.S. Navy in the use of electronic gear, then trained and certified by the Departments of State and Defense as a Mandarin Chinese linguist prior to working for the National Security Agency during my Navy tour of duty. I worked as a Federal wildlife biologist for 17 years, retiring in June 2014 from my position as a Senior Wildlife Biologist with the Division of Migratory Bird Management, U.S. Fish and Wildlife Service (FWS or Service), Headquarters Office, Arlington, VA. I was the Service's national lead on issues related to anthropogenic causes of bird injury and mortality, including from communication towers. In that capacity, I chaired the Communication Tower Working Group (looking at both avian-tower collisions and avian-radiation impacts), working closely with the Federal Communications Commission (FCC), Federal Aviation Administration, other Federal agencies, all the large tower and cell phone trade associations, several cell phone and tower companies, scientists, academicians, and consultants. I was the FWS project officer for the cutting edge tower lighting study at Michigan State Police communication towers (Gehring et al. 2009, Gehring et al. 2011), served as the project officer for a U.S. Coast Guard tall communication tower study, developed a cell tower research monitoring protocol for the U.S. Forest Service (Manville 2002), crafted a peer-reviewed cell tower radiation monitoring protocol, and represented FWS as lead reviewer on many communication tower projects from cell towers to tall, digital television towers. I have published more than 175 professional and popular papers, chapters (including my current chapter in *Problematic Wildlife: a Cross-Disciplinary Approach*; Springer Publishing, 2016), and book reviews. I was considered my agency's lead, go-to person on communication tower impacts to migratory birds and continue to work in consulting and teaching capacities on these issues.

Previous Agreement

On February 4, 2014, the Director of the Office of Environmental Policy and Compliance (OEPC), Department of Interior (DOI), sent a letter to the U.S. Commerce Department's NTIA suggesting regulatory compliance by its FirstNet, a newly created federal entity, implementing development of emergency broadcast systems nationwide (USDOI 2014). Included in those

recommendations were inadequacies which FirstNet had acknowledged and was then proceeding to address. These included inadequacies for conserving migratory birds in Enclosure A of the OEPC letter which I authored while working for the Division of Migratory Bird Management, USFWS. In it, I provided recommendations for addressing bird injury, crippling loss, and death from communication tower collisions; and research needs for beginning to address impacts from non-ionizing electromagnetic radiation emitted from such towers.

The take-home message was clear. We had a federal agency (FirstNet) willing to recognize and begin addressing the impacts of radiation on migratory birds — a significant and important step forward. On February 27, 2014, I began communicating with FirstNet's Director of Environmental Compliance regarding their PEIS, including beginning to address impacts from low-level, non-thermal non-ionizing radiation that FirstNet stated they then did not intend to categorically exclude. We met with FirstNet's Director of Environmental Compliance and her staff on March 20, 2014, and proceeded to help FirstNet further develop their DPEIS.

FCC standards dealing with tower radiation are flawed and continue to be based solely on thermal heating, now more than 30 years out of date. FCC, to date, has been unwilling to update their radiation regulatory standards while, to their credit, they are updating tower lighting, height and guy-wire standards. Significantly lower radiation output does not equate to reduced risk (e.g., Panagopoulos and Margaritis (2008).

I hope FirstNet officials will evaluate their current position based on the recommendations that follow.

Background

Recapping, the electromagnetic radiation standards used by the FCC continue to be based on thermal heating, a criterion now more than 30 years out of date and inapplicable today — except when one is very close to a base station antenna where thermal radiation is at issue. For example, for health and safety reasons, the FCC requires that power to cell and other communication towers must be turned off during maintenance by tower workers.

The current electromagnetic radiation issues are primarily due to the lower levels of radiation output from microwave-powered communication devices such as cellular telephones and their cell towers, emergency broadcast antennas, Wi-Fi, so called "smart meters," and other sources of point-to-point communications; levels typically lower than from microwave ovens. The FCC's radiation standards are currently being legally challenged at cell towers in the U.S. Migratory birds are impacted by these tower structures and their broadcasting/receiving radiation, including by very low levels of non-thermal radiation.

Why Are Migratory Birds Important?

Migratory birds — i.e., those that migrate across U.S., Canadian and/or Mexican borders, of which 1,027 species are currently protected in the United States (50 C.F.R. 10.13 list), are a public trust resource, meaning they belong to everyone. Most birds in the western United States are migratory as they are elsewhere in the U.S. Almost all North American continental birds are protected by the Migratory Bird Treaty Act (MBTA). The Act implements and regulates

bilateral protocols with Canada, Mexico, Japan and Russia. It is a strict liability statute; proof of criminal intent in the injury or killing of birds is not required by enforcement authorities for cases to be made.

The statute and its regulations protect migratory birds, their parts, eggs, feathers and nests from un- permitted possession and "take" (i.e., un-permitted injury, crippling loss, or killing). Migratory bird nests are protected during the breeding season while eagle nests are protected year-round. Efforts are currently underway by FWS to develop a permit where un-permitted and "unintentional take" could be allowed under MBTA; that process began in 2001. A Federal permit is required to possess a migratory bird and its parts, but the MBTA currently provides no provision for the accidental or incidental "take" (causing injury, crippling loss, or death — including from tower collisions and from radiation) of a protected migratory bird, even when otherwise normal, legal business practices or personal activities are involved, such as the construction and operation of the FirstNet emergency broadcast system. The U.S. Congress noted the "take" of even one protected migratory bird to be a violation of the Statute, with fines and criminal penalties that can be extensive. Under the purview of the MBTA and Executive Order 13186 (the Migratory Bird EO), agencies such as FirstNet need to make every effort to "avoid and minimize take" of migratory birds. You already reference in Chapter 9 of this DPEIS the FWS 2013 voluntary communication tower guidelines which I updated, authored and provided to FCC (Manville 2013b), in addition to other BMPs such as the Avian Power Line Interaction Committee guidelines (APLIC 2006, 2012), both which I co-authored.

Bald and Golden Eagles are also protected by the Bald and Golden Eagle Protection Act (BGEPA), an- other strict liability statute. "Take" under BGEPA is more expansive than under MBTA, and includes pursuit, shooting, poisoning, capturing, killing, trapping, collecting, molesting and disturbing both species (50 C.F.R. 22.3). It is important to note that eagles do not simply need to be killed or injured to be in violation of the Eagle Act. "Disturbance take" could result in reduced survivorship of adults, juveniles and chicks, affecting their population viability, including from the construction and operation of FirstNet towers. These "takes" are potential criminal offenses.

Status of Migratory Birds:

Migratory birds are in trouble, including impacts from individual structures and the cumulative communication tower network continent-wide. There are growing numbers of Birds of Conservation Concern (BCCs; USFWS 2008) — species in decline but not yet ready for federal listing as threatened or endangered under the Endangered Species Act (ESA), although some are under listing review. Currently there are 273 species (out of 1,027 protected birds) and subspecies on the national BCC, Service Regional BCC and Bird Conservation Region BCC lists, providing an early warning of likely peril unless the population trends are reversed.

Additionally, there are 93 endangered and threatened bird species on the ESA List of Threatened and Endangered Species. Collectively, BCC and ESA-listed birds represent at least 366 bird species (36%) in decline — some seriously — with numbers of both listed and BCC species growing (Manville 2013a). The FWS is also tasked to maintain stable or increasing breeding populations of Bald and Golden Eagles under implementing regulations of BGEPA and compliance with NEPA — including for broadcast towers.

Bird Collisions:

Migratory birds have been documented killed in single night, mass mortality collision events (up to 10,000 in single night, single tower collision events) with communication towers, guy-support wires, and tower lights in the U. S. since 1948 — Aronoff 1949, summarized in Manville 2007 — including at unguyed, unlit, < 200-ft above-ground-level (AGL) cell towers.

During nighttime migrations, birds can be overwhelmed by inclement weather events, forcing bird fall-out, significant reductions in flight heights, and resultant attraction to lighted structures and confusion (Manville 2014, 2016a) — such as security lighting that may be placed at power sheds, attracting birds, causing them to collide with the towers. Currently an estimated 6.8 million birds/yr are killed in the U.S. and Canada (Longcore et al. 2012). The vast majority of these bird deaths are in the U.S. In another review, at least 13 species of BCCs were estimated to suffer annual mortality of 1-9% of their estimated total population based solely on communication tower collisions in the U.S. or Canada (Longcore et al. 2013). These include estimated annual mortality of > 2% for the Yellow Rail, Swainson's Warbler, Pied- bill Grebe, Bay-breasted Warbler, Golden-winged Warbler, Worm-eating Warbler, Prairie Warbler, and Ovenbird.

Up to 350 species of birds have been documented killed at communication towers (Manville 2014, 2016a). Each time one of these birds is killed at an individual communication tower such as that planned by FirstNet, these "takings" add to the overall impacts to bird populations not unlike the phenomenon of the "death by a thousand cuts." That, of course, is a important purpose of your DPEIS — investigate cumulative effects.

Radiation:

While there is a massive and growing global database — studies being published weekly — on effects of tower and other non-ionizing radiation on wildlife, laboratory animals and humans, and it is important to note that the impacts from both thermal and non-thermal radiation have already been well documented (e.g., www.saferemr.com). In fact, most scientists consider non-thermal effects as well established even though all of the implications are not yet fully understood. Thermal effects are generally pretty clear. It is also important to note that tests on laboratory animals referenced in a radiation memo I provided to FCC in early 2016, and updated for release to the public on July 14, 2016 (excerpted herein; Manville 2016b; http://bit.ly/savewildlifeRFR), such as those on chicken embryos, mice and rats are used as surrogates to predict harm to humans, protected migratory birds and other wildlife. For practical, ethical and legal reasons, wild migratory birds would not otherwise be subjected to laboratory studies on impacts from radiation. Furthermore, scientists generally do not want to perform harmful experiments on either humans or protected wildlife such as migratory birds. Studies on the negative effects of non-thermal radiation to wild birds in Europe, briefly summarized below, are clearly relevant as predictors of what will, is likely, or is happening to wild birds in North America. These issues therefore need to be examined in detail by FirstNet, not categorically excluded as currently done in FCC's flawed approach.

In the June 2016 *Scientific American Blog* (Portier and Leonard 2016), in response to the question, *"do cell phones cause cancer?"* The authors response was clear: *"probably, but it's complicated. The degree of risk almost certainly depends on the length and strength of*

exposure — but we still don't know how significant the actual danger is." These same issues pertain to impacts to wildlife from both thermal and non-thermal effects emitted from cell and broadcast communication towers and FM antennas. I submit that the radiation effects on wildlife need to be addressed by the FCC, the Environmental Protection Agency (EPA), FirstNet, the FWS and other governmental entities.

While radiation studies have been ongoing for decades, not until recently have the effects of low-level, non-thermal electromagnetic radiation on domestic and wild birds been made public. Laboratory studies by T. Litovitz (2000 pers. comm.) and DiCarlo et al. (2002) from the standard 915 MHz cell phone frequency on domestic chicken embryos showed that radiation from extremely low levels (0.0001 the level emitted by the average digital cell phone) caused heart attacks and deaths in some embryos; controls were unaffected (DiCarlo et al. 2002). You already referenced these studies in your DPEIS. However, the effects of microwave (and other) radiation from communication towers on nesting and roosting wild birds are yet unstudied in the U.S. In Europe, impacts have been well documented. Balmori (2005) found strong negative correlations between levels of tower-emitted microwave radiation and bird breeding, nesting, and roosting in the vicinity of electromagnetic fields in Spain. He documented nest and site abandonment, plumage deterioration, locomotion problems, and death in House Sparrows, White Storks, Rock Doves, Magpies, Collared Doves, and other species. While these species had historically been documented to roost and nest in these areas, Balmori (2005) did not observe these symptoms prior to construction of the cellular phone towers.

In a troubling discovery, Balmori (2005) documented "far-field," low level radiation exposures affecting migratory birds out to 300 meters (nearly 1,000 ft) distance from cell towers in Europe. Twelve nests (40% of his study sample) were located within 200 m (nearly 660 ft) of the antennas and never successfully raised any chicks, while only 1 (3.3%), located further than 300 m, never had chicks. Strange behaviors were observed at White Stork nesting sites within 100 m (328 ft) of one or several cell tower antennas. Those birds that the main beam impacted directly (i.e., electric field intensity/EFI > 2 V/m) included young that died from unknown causes. Within 100 m, paired adults frequently fought over nest construction sticks and failed to advance the construction of the nests with sticks falling to the ground while nests were being constructed. Balmori (2005) reported that some nests were never completed and the Storks remained passively in front of cellsite antennas. The electric field intensity was higher on nests within 200 m (2.36 ± 0.82 V/m) than on nests further than 300 m (0.53 ± 0.82 V/m). However, the EMF levels, including for nests < 100 m from the antennas, were not intense enough to be classified as thermally active. Power densities need to be at least 10 mW/cm2 to produce tissue heating of even 0.5 C (Bernhardt 1992). The radio frequencies used in Europe and here in the U.S. are similar to the 700 MHz frequency band FirstNet is planning to utilize.

Balmori and Hallberg (2007) and Everaert and Bauwens (2007) found similar strong negative correlations among male House Sparrows. In another review, Balmori (2009) reported health effects to birds which were continuously irradiated. They suffered long-term effects including reduced territorial defense posturing, deterioration of bird health, problems with reproduction, and reduction of useful territories due to habitat deterioration.

Beason and Semm (2002) demonstrated that microwave radiation used in cell phones produces non- thermal responses in several types of neurons of the nervous system of Zebra Finches. The brain neurons of anesthetized birds were tested with a 900 MHz carrier, modulated at 217 Hz. Stimulation resulted in changes in the amount of neural activity by more than half of the brain cells with most (76%) of the responding cells increasing their rates of firing by an average 3.5-fold as opposed to controls — a clearly definitive study showing non-thermal effects. The other responding cells exhibited a decrease in their rates of spontaneous activity suggesting potential effects to humans using hand-held cell phones affecting sleep (Borbely et al. 1999). The Beason and Semm (2002) theoretical model could also help explain why birds may be attracted to cell towers, an important theoretical premise that they previously hypothesized in regard to Bobolinks (Semm and Beason 1990).

Radiation effects can be characterized as *"near-field"* (near the source of radiation), *"far-field"* (some distance from the source) or *"intermediate."* The growing evidence is clear; there are low-level, non- thermal effects (Manville 2016b: p.4; http://bit/ly/savewildlifeRFR). In a meta-review of studies through 2008, and based on laboratory research they conducted, Panagopoulos and Margaritas (2008) determined maximum radiation distances for both cell phones and for communication towers, based on the Global System for Mobile Telecommunications (GSM) and the Digital Cellular System (DCS). This maximum radiation distance corresponds to an intensity around 10 mW/cm2 for both types of radiation in regards to the RF components — i.e., Bernhardt's (1992) threshold for thermal heating effects. In the Panagopoulos and Margaritas (2008) study, a "near-field" thermal effect which they called an *"intensity window"* appeared at a distance of 20-30 cm for the cell phone antenna, corresponding to a distance of 20-30 meters (66 to 98 feet) from the base antenna. This could be considered a classic nonlinear effect and would also apply to far field exposures where effects from an "intensity window" are greater than expected. Since cell phone base station antennas are frequently located within residential areas where houses and workplaces are often situated at distances 20-30 m from such antennas, not to mention birds nesting and roosting close to these antennas (e.g., Balmori 2005), humans, migratory birds and other wildlife may be exposed up to 24 hours per day. As a recommended mitigation measure, FirstNet should avoid siting any new broadcast antennas in close proximity to human development and in areas prone to heavy migratory bird use — where there are practical and reasonable alternatives. The FWS's 2013 guidelines (Manville 2013b), referenced within the DPEIS, provide some recommendations of where to locate antennas.

Complicating the issue is the fact that there currently are no standards for wildlife exposure, including by the licensing and regulatory rules and procedures of the FCC. Other than the letter to and "agreement" between DOI and FirstNet, neither DOI nor the FWS have any policy or quasi policy that currently ad- dresses radiation effects on migratory birds — with the exception of the 2013 (Manville 2013: p.2) guide- line number 5. recommending at least a 1-mile disturbance-free buffer between new cell towers and nesting Bald Eagles and Ferruginous Hawks. Arguably, "effects" need to be determined by the EPA, which has no funding for this, and regulated as part of a NEPA site review process, including both thermal and non-thermal effects.

There is an increasing body of published laboratory research that finds DNA damage at low

intensity exposures — well below levels of thermal heating — which may be comparable to far field exposures from cell and broadcast antennas, including those being constructed or to be used by FirstNet. This body of work would apply to all species, including migratory birds, since DNA is DNA, whether single-strand or double helix. The first study to find such effects was conducted by H. Lai and N.P. Singh in 1995 (Lai and Singh 1995). Their work has since been replicated (e.g., Lai and Singh 1996, as well as in hundreds of other more recent published studies), performed in at least 14 laboratories worldwide. The take-home message is clear: low level transmission of EMF from cell and other broadcast towers and other sources probably causes DNA damage. The laboratory research findings strongly infer this relationship. Since DNA is the primary building block and genetic "map" for the very growth, production, replication and survival of all living organisms, deleterious effects can be critical.

The entire thermal model and all FCC categorical exclusions for all of the electronic devices we see to- day, rests on the incorrect assumption that low-level, non-ionizing non-thermal radiation cannot cause DNA breaks because it is *"so low-power"* (B. Levitt and H. Lai, Comments Filed Jointly to FCC, ET Docket No. 13-84, 2013). The evidence strongly supports the opposite conclusion: low power produces negative effects. These issues need to be adequately addressed by the appropriate authorities including the FCC, EPA, FWS, and FirstNet. Currently they are not.

Based on their research and meta-analyses, Panagopoulos and Margaritas (2008) concluded that large de- creases in reproductive capacity were being caused by GSM and DCS radiation fields. This included extensive DNA fragmentation on reproductive cells of experimental animals induced by these fields, exerting an intense biological action able to kill cells, damage DNA, and dramatically decrease the reproductive capacity of living organisms, including populations of wild birds and insects. They cautioned, how- ever, that the physical parameters of these radiations, including intensity, carrier frequency, pulse repetition frequency, distance from the antenna, and similar factors provided inconsistency and lack of standardization making it difficult to correlate specific thermal and non-thermal effects to specific types of radiation. Their take-away message, however, was clear: bio-effects to migratory birds, other wildlife, in- sects, laboratory animals and humans continue to be documented from thermal and non-thermal exposures, as well as effects from intermediate exposures between the near-field and far-field levels. All migratory birds are potentially at risk, whether they be Bald Eagles, Golden Eagles, Birds of Conservation Concern (USFWS 2008), Federally and/or State-listed bird species, other birds in peril regionally or population-wide, or birds whose populations are stable. FirstNet must therefore address these issues in the DPEIS and your subsequent implementing instructions. Ignoring non-thermal effects based on flawed FCC standards would not be acceptable.

Cucurachi et al. (2013) reported on 113 studies from original peer-reviewed publications and relevant existing reviews. A limited number of ecological studies was identified, the majority of which were conducted in a laboratory setting on bird embryos or eggs, small rodents and plants. In 65% of the studies, ecological effects of RF-EMF (50% of the animal studies and about 75% of the plant studies) were found both at high as well as at low dosages. Lack of standardization and limited sampling made generalizing results from the organism to the ecosystem level very

difficult. Cucurachi et al. (2013) concluded, however, that due to the number of variables, no clear dose–effect relationship could be found especially for non-thermal effects. However, effects from some of the studies reviewed were well documented, and certainly can serve as predictors for effects to wild, protected migratory birds and other wildlife in North America.

Engels et al. (2014) investigated *"electromagnetic noise"* emitted everywhere humans use electronic de- vices including from cell phones and their towers. While prior to their study on European Robins, no *"noise effect"* had been widely accepted as scientifically proven, the authors in this double-blind experiment were able to show that migratory birds are unable to use their magnetic compass in the presence of urban electromagnetic noise. The magnetic compass is integral to bird movement and migration. The findings clearly demonstrated a non-thermal effect on European Robins and clearly serves as a predictor for effects to other migratory birds including those in North America.

Levitt and Lai (2010) reported numerous biological effects from cell tower radiation documented at very low intensities comparable to what the population experiences within 60-150 m (197- 492 ft) distance from a cell tower, including effects that occurred in studies of cell cultures and animals after exposures to low-intensity RFR. These reported effects were genetic, growth, and reproductive in nature; they documented increases in permeability of the blood–brain barrier; showed behavioral responses; illustrated molecular, cellular, and metabolic changes; and provided evidence of increases in cancer risk — all applicable to migratory birds, other wildlife and to far field exposures in general. They cited published, peer- reviewed examples of effects that included:

Dutta et al. (1989) who reported an increase in calcium efflux in human neuroblastoma cells after exposure to RFR at 0.005 W/kg. Calcium is an important component in normal cellular functions.

Fesenko et al. (1999) who reported a change in immunological functions in mice after exposure to RFR at a power density of 0.001 mW/cm2. These results can serve as predictors for impacts to wild animals.

Magras and Xenos (1997) who reported a decrease in reproductive function in mice exposed to RFR at power densities of 0.000168— 0.001053 mW/cm2. The results also serve as predictors for reproductive impacts to wildlife.

Forgacs et al. (2006) who reported an increase in serum testosterone levels in rats exposed to GSM-like RFR at specific absorption rates (SAR) of 0.018— 0.025 W/kg. The results also serve as predictors for reproductive impacts to wildlife.

Persson et al. (1997) who reported an increase in the permeability of the blood–brain barrier in mice ex- posed to RFR at 0.0004– 0.008 W/kg. The blood–brain barrier is a physiological mechanism that protects the brain from toxic substances, bacteria, and viruses. These findings have clear applicability to wildlife including migratory birds.

Phillips et al. (1998) who reported DNA damage in cells exposed to RFR at the SAR of 0.0024–0.024 W/kg. DNA is integral to the very function and survival of all living organisms, including migratory birds.

Kesari and Behari (2009) also reported an increase in DNA strand breaks in brain cells of rats after expo- sure to RFR at the SAR of 0.0008 W/kg. The results also serve as predictors for impacts to DNA in wild- life. And, Belyayev et al. (2009) who reported changes in DNA repair mechanisms after RFR exposure at a SAR of 0.0037 W/kg. DNA is integral to the maintenance and repair of cells and cellular function in all animals. All sources from above were cited in Levitt and Lai (2010).

In a 2-year study conducted by the National Toxicology Program (NTP) of the National Institutes of Health (May 2016), NTP (Wyde 2016) reported partial findings from their $25 million study on cancer risk to laboratory rodents from cellphone radiation. The report summarizes a long-term exposure study to cell phone radiation, with statistically significant evidence of DNA damage from non-thermal exposure to cellphone radiation to laboratory mice and rats. Controlled studies on laboratory rats showed that cell- phone radiation caused 2 types of tumors, glioma and schwannoma, the results which *"could have broad implications for public health."* The report has been characterized as a *"game-changer"* as it proves that non-ionizing, radiofrequency radiation can cause cancer without heating tissue. The researchers con- trolled the temperature of the test animals to prevent heating effects so the cancers were caused by a non- thermal mechanism. The report on the mice component of the study will be released at a later date. Not surprisingly, much of the media coverage contained considerable bias or "media spin" intended to create doubt about the study's important findings regarding cancer risk from exposure to cellphone radiation (Moskowitz 2016). The implications are troubling for migratory birds and other wildlife.

Summary Recommendations

Levitt and Lai (2010) concluded that the obvious mechanism of effects from RFR are thermal (i.e., tissue heating) — which is what FCC bases its current radiation standards on, even if they are more than 30 years out of date and rejected both by the Department of Interior and Department of Commerce (USDOI 2014, Manville 2016a) as incomplete. However, for decades, there have been questions about non- thermal (i.e., not dependent on a change in temperature) effects, whether they exist, and what specifically causes the effects to surface. The sources cited above should help dispel that doubt or at the very least show that non-thermal effects do indeed occur, have been well documented, and can have significant deleterious effects on migratory birds and other wildlife.

Practically, as Levitt and Lai (2010) concluded, we do not actually need to know whether RFR effects are thermal or non-thermal to set exposure guidelines. Most of the biological-effects studies of RFR that have been conducted since the 1980s were under non-thermal conditions, including the most recent NTP (2016) studies. In studies using isolated cells, the ambient temperature during exposure was generally well controlled. In most animal studies, the RFR intensity used usually did not cause a significant in- crease in body temperature in the test animals. Most scientists consider non-thermal effects as well established, even though the implications are not fully understood.

Scientifically, Levitt and Lai (2010) concluded that there are three rationales for the existence of non- thermal effects:

1. Effects can occur at low intensities when a significant increase in temperature is not likely.

Heating does not produce the same effects as RFR exposure.

RFR with different modulations and characteristics produce different effects even though they may produce the same pattern of SAR distribution and tissue heating.

There is virtually no non-thermal research to indicate what is safe for either humans or wildlife, including migratory birds which are highly sensitive to perturbations in ways humans are not (see previous citations). Unfortunately, there also is very little far-field, distance-to-safety research for wildlife — most especially for migratory birds — as this has not been studied with that focus in mind. What little EMF/RF field research on wildlife that has been conducted, its focus has been on behavior, mortality and reproductive outcomes (e.g., B. Levitt and H. Lai, Comments Filed Jointly to FCC, ET Docket No. 13-84, 2013; Balmori 2005, 2009; Balmori and Hallberg 2007; Everaert and Bauwens 2007; Engels et al. 2014; Wasserman et al. 1984; and Semm and Beason 1990).

In summary, we need to better understand, tease out, and refine how to address these growing and poorly understood radiation impacts to migratory birds, bees, bats, and myriad other wildlife. Currently, other than to proceed using the precautionary approach and keep emissions as low as reasonably achievable, we are at loggerheads in advancing meaningful guidelines, policies and regulations that address non-thermal effects. The good news: there appears to be an awakening at least within a significant segment the scientific community to the realization that these issues must be addressed — for the health of humans, wildlife and our environment — and hopefully FirstNet will continue on the course of assessing how to minimize the impacts of radiation on wildlife and humans as had been agreed to in 2014.

Suggested Next Steps for FirstNet

The following suggestions would help significantly advance the need to address effects/impacts from non-thermal radiation on migratory birds and other wildlife, and help in further reducing collision impacts and habitat fragmentation:

- We desperately need to conduct field research on thermal and non-thermal radiation impacts to wild migratory birds and other wildlife here in North America, similar to studies conducted in Europe. Specifically, the research focus should center on causality for *"near-field," "far-field"* and *"intermediate"* effects, ideally based on some standard, agree-upon radiation metrics. FirstNet and leading independent radiation experts (ideally none affiliated with the communication industry) should work together to develop radiation metrics. The metrics need to be consistent with standards for intensity, carrier frequency, pulse repetition frequency, distance from the antenna, and similar factors. The research must be based on peer-reviewed monitoring and testing protocols (e.g., upgrades to the Manville 2002 peer-reviewed research protocol submitted to the U.S. Forest Service for studies on cell towers in Arizona, and key methodologies used in studies previously referenced in the Manville [2016b] memo, among others). The research needs to be conducted by credible, independent third party research entities with no vested interest in the outcomes, and the results need to be published in refereed scientific journals, made available to the public and the affected federal agencies.
- Studies need to be designed to better tease out and understand causality of thermal and non-thermal impacts from radiation on migratory birds. Results need to be carefully compared

with findings from Europe and elsewhere on wild birds, and efforts need to be made to begin developing exposure guidelines for migratory birds and other wildlife based on dose-effect and other nonlinear relationships. We do not actually need to know whether RFR effects are thermal or non-thermal to develop and set exposure guidelines (Levitt and Lai 2013).

- To minimize deleterious radiation exposures, these guidelines should include use of avoidance measures such as those developed by the electric utility industry for bird collision and electrocution avoidance (APLIC 2006, 2012). In the case of Bald Eagles, the communication tower guidelines refined and updated by FWS (Manville 2013b) — and submitted to the FCC and industry — recommend one-mile disturbance free buffers during active nesting of Ferruginous Hawks and Bald Eagles, and 0.5- mile buffers around other active raptor nests, based on nest studies conducted by the Wyoming Ecological Services Field Office in that State; Guideline number 5. Impacts must address collision mortality, crippling loss, and injury; mortality, injury, population viability and survivorship based on impacts from radiation; as well as disturbance and habitat fragmentation. The updated 2013 Service Guidelines were intended to be inclusive.
- Agencies tasked with the protection, management, and research on migratory birds and other wildlife (e.g., FWS, U.S. Geological Survey, National Park Service, U.S. Forest Service, Bureau of Land Management, and USDA Wildlife Services, among others) need to develop radiation policies that avoid or minimize impacts to migratory birds and other trust wildlife species. This means supporting — and where applicable — conducting research, and developing policies that help minimize radiation impacts. FirstNet can work with these agencies in support of these efforts.
- As Levitt and Lai (2010) concluded, we do not actually need to know whether RFR effects are thermal or non-thermal to set exposure guidelines. Most scientists consider non-thermal effects as well established, even though the implications are not fully understood.
- Given the rapidly growing database of peer-reviewed, published scientific studies (e.g., http://www.saferemr.com, School of Public Health, University of California, Berkeley), it is time these issues be addressed both by FCC and NTIA.
- Without question, these are challenging and daunting issues. FirstNet can begin by taking "small bites out of this 800 pound gorilla" first by developing a siting review process for new towers based on bird- and human-friendly habitats — using the precautionary approach as the direction forward — much like what FWS did following release of its 2000 guidance through a site review process. Proper site location will help to minimize collision and radiation impacts, especially given the scientific information we have available (many sources referenced within these comments). Meanwhile, FirstNet needs to proceed as agreed to in 2014 with helping support independent field radiation research, including in the DPEIS review process, implementing instructions, and through funding and agency support. It is important for FirstNet to begin focusing on new tower siting and location — given the enormity of this endeavor. Implementing the BMPs recommended in this DPEIS and suggestions provided in these comments would be a good start.

Thank you for the opportunity to comment on this complicated but incredibly important issue. Hopefully reasoned minds will prevail, impacts of non-thermal radiation will be included as part of this review, and BMPs will result in a significant reduction of impacts to migratory birds, other wildlife and humans.

Respectfully submitted
Albert M. Manville, II, Ph.D., C.W.B.

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United States Department of Interior. 2014. ER 14/0001-14/0004. Letter to Mr. Eli Veenendaal, Natl. Telecommunications and Information Administration, US Dept. Commerce. Signed by W.R. Taylor, Di- rector Office of Environmental Policy and Compliance, Office of Secretary, DOI. February 7, 8 pp, in the public arena.

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Comments from Naveen Albert

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From: InterLinked CEO

Sent: Friday, December 16, 2016 6:48:49 AM

To: Genevieve Walker

Subject: Comment on FirstNet Draft Environmental Impact Statements

Wired technologies are far more reliable, far more secure, and much faster than wireless technologies. In addition, the electromagnetic radiation emitted by wireless technologies, such as cell phones, cordless phones, smart meters, cell towers, and Wi-Fi, has been declared a Class 2B carcinogen by the World Health Organization. Numerous peer reviewed studies have also found biological health impacts down to very low exposure levels, far below our FCC guidelines which are largely ineffective,

I kindly request that Congress eliminate the provision of wireless broadband from the FirstNet mission
At the very least, delay implementation of the wireless First Responder component until a system is designed that minimizes RF emissions from antennas and communicators

There are numerous cancer studies with findings regarding first respondents,

Please also see this NTP study: http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat- cancer-study/
Thus, communicators should be able to contact each other directly, not require an outside antenna (certain types of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed.

Here are just a few more studies:

The Central Region document is available at the following site:

https://www.regulations.gov/document?D=FIRSTNET-2016-0003-0001

The East Region

https://www.regulations.gov/document?D=FIRSTNET-2016-0002-0001

The South region is available for review and comment at the following link:

https://www.regulations.gov/document?D=FIRSTNET-2016-0005-0001

West Region
https://www.regulations.gov/document?D=FIRSTNET-2016-0004-0001 or
https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&D=FIRSTNET-2016-0004

"*The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer*"
(http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18)
"*Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions*"
(http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July %202011.pdf)
"*How does long term exposure to base stations and mobile phones affect human hormone profiles?*," Eskander et al.
(http://www.sciencedirect.com/science/article/pii/S0009912011027330)

FirstNet wireless technology is supposed to be LTE 4G - much higher RF levels are emitted by 4G technologies than necessary,

Remember, in a disaster, wireless technologies fail. Please make sure we keep safe, affordable, reliable corded landline telephone service, and abandon initiatives to do otherwise

Do not stand behind FCC regulations. FCC regulations do not protect from "any potential effects," as this letter from Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, regarding the limitations and purpose of the FCC exposure standards notes (http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf) This very credible evidence is unmentioned and ignored. Furthermore FCC regulations are poorly enforced. (An issue which is completely ignored in the PEIS.) Rampant violations are documented by the Wall Street Journal and EMR Policy Institute. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (http://www.marketwire.com/press-release/-1770139.htm). A Wall Street Journal investigation (https://www.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.

A fully elucidated mechanism should not be required to take action to protect public health when detrimental effects are found. Serious biological effects are acknowledged and then ignored on page 2-20.

The two mechanisms that are extremely plausible and well-supported in the literature are completely ignored: Oxidation -

1. Yakymenko, I., Tsybulin, O., Sidorik, E., et al. (2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. Electromagn Biol Med. Jul;7:1-16. http://www.ncbi.nlm.nih.gov/pubmed/26151230#

Ca 2+ channels

1. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard Recent Res Devel Mol Cell Biol 7.

Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. J Chem Neuroanat DOI: 10.1016/j.jchemneu.2015.08.001. http://dx.doi.org/10.1016/j.jchemneu.2015.08.001

Pall, M.L. (2016)

Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1.

The PEIS uses outdated documents to excuse inaction.

Contrary to their assertion, FCC limits do not protect against adverse effects, even the DOI noted "**the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today**" (http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf)

The opening of the FCC docket to re-evaluate limits is acknowledged, but then ignored. The logical step of delaying implementation of the wireless component until that is completed is not even mentioned.

The National Toxicology Program findings are not even mentioned.

Their exposure calculations are based on only one antenna and work out to 477uW/m2, which is over the level shown to cause biological effects (http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf see graph at end). Most towers or building antenna sites have more than one antenna radiating in any given direction, plus signals come from other nearby sites, and the ground infrastructure such as cellphones, tablets etc. So levels at ground level are likely to be far higher than that and levels in apartments or homes which get a direct hit from neighboring buildings could be far higher depending on distance.

Several IARC panelists have made public statements that the evidence now shows that radiofrequency radiation should be classified as either a class 2A or class 1 human carcinogen. The recent (ignored) National Toxicology Program findings support this. This should cause the wireless portion to be stopped and FirstNet should explain why to Congress, but no mention is made and therefore no such action is recommended.

They refuse to take action to protect birds in spite of lab and epidemiological evidence that support each other in finding hard because it requires "interpretation and extrapolation."(2-20) Doesn't it always?

They hardly touch on tree damage and totally ignore the following tree and plant studies:

- Radiofrequency radiation injures trees around mobile phone base stations: https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations
- Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations https://www.hindawi.com/journals/ijfr/2010/836278/
- Review: Weak radiofrequency radiation exposure from mobile phone radiation on plants: http://www.ncbi.nlm.nih.gov/pubmed/27650031?dopt=Abstract
- Tree damage in the vicinity of mobile phone base stations: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf
- The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf
- Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. - **IMPORTANT MECHANISTIC DISCUSSION**

On 2-20 the PEIS acknowledges "*A number of other studies generally touch upon the nature of RF exposure and the disruption of biological processes that are fundamental to plant and animal growth*

and health, including but not limited to behavior, DNA damage, immune deficiencies, reproductive system effects, hormone dysregulation, degraded cognition and sleep, and desynchronization of neural activity (BioInitiative Working Group, 2012) (Balmori, A., 2005)," **but then no protective action is being taken because** "*The common practice for NEPA documents related to cellular towers is to cite FCC standards and point to the fact that they would be built and operated according to allowable FCC RF emission limits. Some NEPA documents that have more directly addressed the RF emissions potential largely point to the existing literature and suggest that although there is evidence that RF emissions could potentially affect some species, the evidence is insufficient to support a finding of adverse impacts on these species due to RF emissions (Ballistic Missile Defense Organization, 2000) (FCC, 2012).*"

This approach was not allowable by the courts in other situations. Especially since the inadequacy of the FCC RF limits is now acknowledged by both the DOI and the EPA. In addition, numerous studies have added to the knowledge about the hazard that RF poses to human health since both 2000 and 2012, including the NTP study which has found that RF is carcinogenic and breaks DNA.

Please consider the best interests of us and the environment before making a potentially poor choice. DO THE RIGHT THING (hint: it's not hard!)

Naveen Albert

Naveen Albert

CEO, InterLinked Project - www.interlinked.x10host.com

Director, Wireless Action - Your Health, Safety, and Privacy are at stake!

Member, Save Landlines & Stop Smart Meters Coalitions - www.savelandlines.org ; www.stopsmartmeters.org

Cell phones, cordless phones, and Wi-Fi have been linked to cancer and other negative health effects. Learn more, sign petitions, and take the survey at https://wirelessaction.wordpress.com/

"Getting rid of your landline is like getting rid of your refrigerator and using a cooler"

"Getting rid of your landline is like disconnecting from the water utility because they sell bottled water at the store"

This message was sent safely and securely over an Ethernet cable.

Comments from Michelle Illiatovitch

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From: Michelle Illiatovitch

Sent: Thursday, December 15, 2016 4:12:27 PM

To: Genevieve Walker

Subject: Pending bill regarding RF emissions

Dear Ms. Walker,

I am a 70 year old woman who's health has been compromised by the increasing amount of RF due to wireless implements. M world has become smaller as it is impossible to do many things I would have done such as going to the library, shopping in stores or having a coffee with a friend at a coffee shop to name a few. Not earth shattering you might say, but my world has diminished nonetheless.

I also watched the health of my daughter, who is a young woman,26 years, deteriorate dramatically when living in a building with cell phone towers on top. I have read scientific reports about fire fighters contracting brain cancer due to the cell phone towers on their firehall. The studies are numerous and even if for some strange reason you do not find it conclusive, it should be enough to at least give pause, be cautious and err on the side of safety.

I urge you to consider the science and support better regulations regarding cell use and first responders.

Sincerely,

MIchelle Illiatovitch

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Comments from Catherine Kleiber

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From: Kleiber

Sent: Friday, December 16, 2016 2:26:09 AM

To: Genevieve Walker

Subject: Re: FirstNet PEIS

Dear Ms. Walker,

Thank you for your patience. Please find my comments and supporting documentation attached. Please let me know if you are unable to obtain copies of other references I mention.

Thank you again, Catherine Kleiber

From: Kleiber

Sent: Saturday, January 28, 2017 4:55 PM

To: Genevieve Walker

Subject: Re: FirstNet PEIS

Dear Ms. Walker,

I did not become aware of the paper, *When theory and observation collide: Can non-ionizing radiation cause cancer?*, until after I sent my comment on the FirstNet PEIS to you. I am sending it now so that you can include the information in the PEIS. It provides further support for my contention that "FirstNet must inform Congress of the health and environmental hazard posed by the RF radiation emission required for wireless broadband and request Congress to eliminate provision of wireless broadband internet from FirstNet's mission." and also my further points that "FirstNet must inform Congress of the health and environmental hazard posed by the RF radiation emission required for wireless broadband and request Congress to eliminate provision of wireless broadband internet from FirstNet's mission." and "FirstNet should request that the NTP quickly undertake and complete toxicology studies comparing the different communication technologies, including, but not necessarily limited to, 3G, 4G, and 5G LTE technologies so that FirstNet can utilize the least toxic least biologically active technology for its first responder's interoperable communication system."

The guideline authored by the **European Academy for Environmental Medicine (***EUROPAEM)*, which I also did not have yet at the time I sent you my comment, provides further support for the above mentioned points. *EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses* (https://www.degruyter.com/view/j/reveh.ahead-of-print/reveh-2016-0011/reveh-2016-0011.xml?format=INT) states "*Studies, empirical observations, and patient reports clearly indicate interactions between EMF exposure and health problems.*" They are clear that in treating individuals experiencing health problems related to EMF exposure, including from radiation emitted by wireless technology, that the preferred treatment is to eliminate exposure - "*The primary method of treatment should mainly focus on the prevention or reduction of EMF exposure, that is, reducing or eliminating all sources of high EMF exposure at home and at the workplace.*" The authors reiterate and support the statement by Hedendahl, Carlberg, and Hardell that "*It is time to consider ELF EMF and RF EMF as environmental pollutants that need to be controlled*". They also make it clear that sources of EMF, including radiation from wireless technology, should be minimized in society so that previously injured individuals can fully participate.

Neither the population nor first responders should be exposed involuntarily to radiation from wireless technology since studies have found it to be carcinogenic and biologically harmful.

Thank you for adding this letter and these studies to the commentary on

the First Net PEIS. Sincerely,

Catherine Kleiber

Public Comment - NIDILRR

Catherine Kleiber

Public Listening Session Comment November 18, 2016

My name is Catherine Kleiber. I have radiofrequency sickness, an environmentally-induced functional impairment caused by exposure to radiofrequencies, from either wireless technology or "dirty" electricity. I am addressing you today to highlight the need to again make public places and buildings accessible for people with radiofrequency sickness.

I experience many symptoms, including cardiac arrhythmias, cognitive difficulties, memory problems, headaches, and fatigue when I am around radiation from wireless technology. The presence of wireless internet and wireless devices in public places now prevents me from using the public library or the judicial system, participating in public meetings, going to restaurants, going shopping, and using public transportation. All are things that I used to be able to do without experiencing functional impairment prior to the proliferation of wireless devices. Most importantly, I can no longer safely access medical care due to the ubiquitous presence of wireless technology in hospitals and clinics. I am not alone. Over 300 comments from U.S. citizens pleading with the FCC to establish biologically-based safety limits for radiofrequency radiation to replace the existing outdated thermally-based radiofrequency limits were submitted in their docket to re-evaluate the RF limits.

It is extremely important that people with radiofrequency sickness be able to access hospitals, medical facilities, and government buildings. WiFi and other wireless technology poses a significant, potentially life-threatening, access barrier for people with radiofrequency sickness. Access to medical care is generally considered a human right, a right now being denied those with radiofrequency sickness.

Access to public facilities by people with radiofrequency sickness is protected under the 2008 ADA Amendments which specifically protects individuals with environmentally-induced functional impairments. Radiofrequency sickness is a functional impairment induced by radiofrequency exposure, which can cause serious, even life-threatening functional impairment.

A replicated double-blind placebo-controlled study documented that cardiac arrhythmias occur in some people in response to exposure to radiation from cordless phones. This is obviously a potentially life- threatening functional impairment. My children experience cardiac arrhythmia in response to radiation from wireless technology, as do I.

My husband, a type 1 diabetic, finds that his blood sugar elevates markedly in response to radiation from wireless technology. If he tries to compensate by taking additional insulin, as he normally would, his blood sugar plunges dangerously low upon leaving the affected area. He recently had a new and very scary reaction. While at a federal office for an essential appointment, he was forced into close proximity to two functional smart phones and a WiFiing computer. He went into the office feeling fine with a normal blood sugar and came out with a very high blood sugar, a very elevated body temperature of 101 degrees Farenheit, and feeling

awful. It took two days for his blood sugar and body temperature to return to normal and about a week to feel well. RF has been shown to cause calcium ion efflux.

Inappropriate calcium efflux is known to cause a condition called malignant hyperthermia which can be fatal and is usually caused by certain anesthetics. Fortunately for him, the reaction stopped accelerating when he came home to our shielded house and then crawled into our shielded bed. It could easily be a fatal reaction for someone who did not realize what was happening.

The presence of wireless radiation at levels which cause functional impairment is making it harder for us to earn our living. We had to quit bringing our pasture-raised meat products to the local farmers markets two years ago since my husband could no longer be at the market without experiencing serious neurological effects suggestive of early ALS that disappeared when he stopped attending market. I have not been able to function well enough cognitively at the market to vend for several years. Being unable to sell at the market has decreased our ability to earn our living.

Obviously, if we cannot tolerate the RF environment outside in the city, working in an office or store in the city with their multiplicity of WiFi routers and high volumes of individual cellphones would not be possible.

Disability claims related to symptoms or syndromes which have been connected to functional impairment by RF (RF Sickness) are rising. People with multiple sclerosis, fibromyalgia, chronic fatigue syndrome, asthma, and diabetes have improved when their RF exposure from wireless technology and "dirty" electricity is minimized. Eliminating RF from public places will improve accessibility and decrease disability.

It is time that national accessibility standards address the very serious access barrier posed by radiofrequency pollution.

Background

Our Experience: Wireless Technology is an Access Barrier

Radiofrequency radiation, such as the radiation given off by wireless devices and their base stations (antennas) can cause an environmentally-induced functional impairment called Radiofrequency sickness (see Dodge http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge_1969.pdf).

I have radiofrequency sickness which was originally misdiagnosed as chronic fatigue syndrome. However, once I found out I was being exposed to large amounts of radiofrequencies from electrical pollution, including "dirty" power on my wires and plumbing, and reduced that exposure as much as I was able, I began to recover almost immediately.

Here is a brief summary of symptoms I experienced as a result of the functional impairment caused by radiofrequency exposure from electrical pollution: heart palpitations, very pain sensitive, constant nerve pain, sluggish reactions, poor depth perception, muscle weakness, lactic acid buildup with little exertion, unrefreshing sleep, often wakeful in the night, fatigue, night

sweats, poor circulation to my extremities, reflux, difficulty concentrating, difficulty thinking, inability to make decisions, low-grade fever and chills, headaches, and a dry sore throat.

After we reduced our exposure as much as possible, I was well at home for years and able to participate in family gatherings, go to the doctors, and generally participate in society because I could always plug in filters to minimize the electrical pollution. We had children. When my youngest was about three, our utility began installing transmitting electrical meters in the area. Shortly after that we all began experiencing serious functional impairment, even at home, from the radiofrequency pollution the transmitting electrical meters put on the electrical wiring along with the power line communications frequencies.

Utilities providing basic service (electricity, gas, and water) should not be allowed to use transmitting utility meters. There are many examples of utility companies bullying customers with threats of disconnected service to force them to take transmitting utility meters, including my family. There are many examples of people being disabled by the radiation from transmitting utility meters and even forced from the neighborhood by the radiation from neighbors' utility meters, even when they have been able to have an analog meter on their own home (see FCC docket below for some of them). We still had analog meters and yet, the radiation coming off of our end-of-the-line transformer from all the meters and cell towers caused cardiac arrhythmias in our two young children and for my husband and me.

We slept in a tent well away from the building site while we tried to deal with the utility and PSC. Our younger son's heart rate got so slow one night when we were forced by broken tent poles to sleep at home that he lost bladder control, wetting only his underwear because the volume of urine was so small. When I went to him in response to his call, he was agitated and upset, but his heart rate was very slow and the beats were weak and irregular. This continued for a couple of hours. We did not sleep in the house again after that until the utility company removed the secondary power line from their transformer to our house. It was obvious the situation was too dangerous to be allowed to continue. So, we did the only thing we could do and told the utilities to remove our service and we went off-grid since they refused to even properly investigate the situation, never mind do anything.

After going completely off-grid, we had three heavenly weeks. We slept well, felt well, and had lots of energy. Our pets' health improved. Most importantly, our sons' cardiac rhythms had almost completely normalized.

Unfortunately, the toxic exposure we received has left our whole family extremely sensitized to radiofrequency radiation so when, in early January 2012, 4G cellphone service was installed in our area we began to experience impairment quickly. Within a week, our sons' cardiac rhythms were again highly irregular. Our younger son was again waking us in the night crying and feeling unwell with a highly irregular cardiac rhythm. We have shielded in various ways and keep pulling them back from the brink.

The drastic measures we have taken (e.g. going off-grid, shielding) to reduce their exposure have momentarily stabilized them at about early stage 2 radiofrequency sickness. (See Dodge) We are very concerned that any increase in the radiofrequency radiation levels could again push them over the edge toward stage 3 radiofrequency sickness. They should not be involuntarily exposed

to a pollutant that has such profound detrimental effects on them.

We are literally trapped on our farm and in our home as outdoor radiofrequency radiation levels have climbed rapidly over the few years. We have had to restrict the amount of time our outdoors-loving sons can be outside. They are now only able to be out a half an hour at a time a few times a week. If they are out more than that with any regularity their cardiac arrhythmias become severe enough that they become symptomatic. We have difficulty going anywhere due to all the radiation from towers and the WiFi and cellphones present indoors are even worse, often causing symptomatic arrhythmias almost immediately.

Because of the serious effects exposure to radiofrequencies has on my health, we have never owned a cellphone, cordless phones, wireless router, baby monitors, or subscribed to wireless internet.

Our children both experience health problems when exposed to radiofrequencies. They feel sick, become hyperactive, less able to think logically and control their behavior. They also sleep poorly in bad radiofrequency environments. The recent increase in radiofrequency radiation exposure from the transmitting electrical meters and wireless technology has given them chronic cardiac arrhythmias which improve when we can reduce their exposure. We have done this several times only to have ambient levels increase and cause the arrhythmia to return.

We are homeschooling them so they will not be exposed to the dangerous radiofrequency environment in our local public school. The school has both WiFi and high electrical pollution levels. We are unable to bring them to the zoo, museums, most parks, indeed almost anywhere, because of the ubiquitous presence of radiation from wireless technology.

Our social isolation by wireless technology is a total violation of our civil rights. Wireless technology needs to be eliminated from public buildings and public places.

Elimination of Wireless from Public Buildings and Public Places is a Reasonable Accommodation

In consideration of wireless technology's exclusionary effect and the very real threat it poses to public health (see www.bioinitiative.org and http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf) and the environment (http://www.moef.nic.in/downloads/public-information/final_mobile_towers_report.pdf), it is reasonable to eliminate radiation from wireless devices from the public arena. Internet access should be provided using publicly available wired connections. In addition, radiofrequency radiation detectors can remind people to turn off wireless devices as they enter public buildings.

My family's on-going nightmare of societal exclusion and serious functional impairment, caused by the presence of biologically active levels of radiofrequencies on the electrical grid and radiofrequency radiation transmitted into the environment through use of wireless technology, is illustrative of why it is essential to establish biologically-based radiofrequency radiation safety limits. The Environmental Protection Agency should be given the authority to do so since the FCC lacks the expertise. In the meantime, eliminating radiation from wireless technology from public places would allow people with radiofrequency sickness to participate in society.

I have maintained the website www.electricalpollution.com since 2002, shortly after I discovered that the radiofrequencies present on building wiring and flowing across the ground from non-linear time varying loads were making me, and others, sick. Research on the health effects of electrical pollution is available on the website on the Research Page. More technical information is available on the Technical Page. Electrical pollution is a very potent form of exposure to radiofrequencies. Exposure to all forms of radiofrequencies, including electrical pollution, must be included in standards regulating exposure of the general public to protect the public health during continuous exposure.

I have read widely on the research into the health effects of exposure to radiofrequencies. There is a growing body of evidence that the increased exposure to radiofrequencies from radiowave and microwave transmitters and from electrical pollution are behind the public health crisis that has dramatically increased utilization of our medical system for chronic conditions. The article by Halberg and Johansson in *Pathophysiology* supports this contention. The comprehensive review by Dr. Cherry, which documents health effects and explores mechanisms, besides thermal mechanisms, through which microwave and radiowave radiation can impact health, also supports the contention that exposure to microwave and radiowave radiation is a public health threat which is probably contributing to significant public illness. A review of the Soviet literature on radiofrequency sickness by Christopher Dodge[3] of the Naval Observatory discusses radiofrequency sickness in detail. The symptoms attributed to chronic exposure to radiofrequency radiation mirror the deterioration of health being seen in the U.S. in recent years, probably due to the dramatic increase in exposure to radiofrequencies from electrical pollution and wireless technology. Papers by Dr. Milham[4], Dr. Havas[5,6,7] and Dr. Wertheimer[8] also show that exposure to electrical pollution constitutes a public health threat, as does a report by Char Sbraggia regarding health improvements experienced by teachers and students when the electrical pollution in their school was cleaned up (http://www.electricalpollution.com/images/MelMinNurse.jpeg). These are just a few of the papers I have read. However, **they provide a picture which should illustrate how reasonable it is to institute the accommodations necessary to enable people with radiofrequency sickness to participate in community life, utilize public services, and enter public buildings**.

1. Ö. Hallberg, O. Johansson, Apparent decreases in Swedish public health indicators after1997—Are they due to improved diagnostics or to environmental factors? Pathophysiology(2009)

Cherry, N. 2000 Criticism of the Health Assessment in the ICNIRP Guidelines for Radiofrequency and Microwave Radiation (100 kHz- 300 GHz)

Dodge C. Clinical and Hygienic Aspects of Exposure to Electromagnetic Fields. Biological Effects and Health

Implications of Microwave Radiation, Symposium Proceedings, Richmond, Virginia, September 17-19, 1969.

Milham S, Morgan L. 2008 A New Electromagnetic Exposure Metric: High Frequency Voltage Transients Associated With Increased Cancer Incidence in Teachers in a California School. American Journal of Industrial Medicine.

Havas M, Olstad A. 2008. Power quality affects teacher wellbeing and student behavior in three Minnesota Schools, Science of the Total Environment, July.

Havas M. 2006. Electromagnetic hypersensitivity: biological effects of dirty electricity with emphasis on diabetes and multiple

sclerosis. Electromagnetic Biology Medicine 25(4):259-68.

Havas M. 2008. Dirty Electricity Elevates Blood Sugar Among Electrically Sensitive Diabetics and May Explain Brittle Diabetes. Electromagnetic Biology and Medicine, 27:135-146.

Wertheimer N, Savitz DA, Leeper E. 1995 Childhood Cancer in Relation to Indicators of Magnetic Fields from Ground Current Sources Bioelectromagnetics 16: 86-96.

Accommodations for people with radiofrequency sickness are really common sense and societally beneficial because radiofrequency radiation poses a serious threat to the public health.

"Public safety standards are 1,000 – 10,000 or more times higher than levels now commonly reported in mobile phone base station studies to cause bioeffects."(http://www.bioinitiative.org/conclusions/)

Accommodations necessary for people with radiofrequency sickness

Provision of Basic Services: Utilites - water, gas, electric

People with radiofrequency sickness are being forced to choose between forced to experience serious environmentally-induced functional impairment in order to access utility services. NIDILRR needs to put the PSC/PUCs on notice that it is their job to force utility companies to comply with the 2008 ADA Amendments which require accommodation of people with environmentally-induced functional impairment. At this time, many utilities and PSC/PUCs are flatly refusing to provide any accommodation, never mind the important accommodation of metering utility service with an analog mechanical meter which used to be standard operating procedure until recently. Many utilities are pretending these meters are no longer available. They are.

Telephone
Telephone companies must be required to provide RF interference-free copperwire telephone service to people with RF sickness. Most people with RF sickness cannot use cellphones. Cable phones and fiber optic phones can come with electronics that emit biologically significant RFI (RF interference - which can be Incidental or Unintentional, but is still biologically active) and are intolerable to some people with RF sickness. Phone companies need to provide RF filters and DSL filters to people with RF sickness without a hassle. Experience has shown that RF cross-contamination between lines (DSL to non-DSL lines) and between lines and electrical grid RF can be biologically significant so all lines should be equipped with filters. (From a public health perspective, it would be best if these were provided to all customers as a matter of course. All people experience biological effects from RF exposure, but many are either still compensating well enough they are not symptomatic or they simply do not make the connection between exposure and symptoms.)

Transportation
Most people with RF sickness are unable to use public transportation due to the presence of wireless radiation. Therefore, it is of paramount importance that people with RF sickness have access to stripped-down low RF automobiles. These would be the safest automobiles for everyone, but they are essential for those with RF sickness to retain independent mobility. For more details, please read my attached comment related to cars which was submitted into

the TECHNOLOGICAL ADVISORY COUNCIL (TAC) NOISE FLOOR TECHNICAL INQUIRY (ET Docket No. 16-191).

Regulatory
The FCC Noise Rules urgently need to be updated to prevent new electrical devices, lighting, etc. from being sold and used in the public arena that block access by people with radiofrequency sickness. The existing FCC Noise Rules are solely designed to prevent technological interference. They need to be revised to prevent new electrical devices from being access barriers or from causing a public health threat. For more details, please read my attached comment about the need to update the noise limits which was submitted into the TECHNOLOGICAL ADVISORY COUNCIL (TAC) NOISE FLOOR TECHNICAL INQUIRY (ET Docket No. 16-191).

Below is a list of accommodations necessary to allow people with radiofrequency sickness to once again participate fully in public and community life. It is divided into two categories - one for transmitted radiofrequency radiation and one for radiofrequency exposure from "dirty" electricity.

Transmitted radiofrequency radiation accommodations:

- Adopt Salzburg, Austria radiofrequency radiation safety limits until biologically-based population- protective RF safety limits can be established (1microW/m2 inside and 10microW/m2 outside - lowered as necessary to prevent biological effects because our experience shows that levels should be below 3microW/m2).
- Eliminate wireless internet service from public places (including transportation).
- Transmitters on wireless devices turned off in public places - detectors should be installed at entrances to remind people.
- Hospitals only use wired internet, wired in-building networks, and wired devices within the hospital. This would also protect privacy and security.
- Cell and broadband antennas situated at a distance from hospitals and residential areas such that Salzburg radiation limits of 1microW/m2 not exceeded inside the hospital or homes.
- Medical clinics use only wired in-office network and internet service and devices.

"Dirty" electricity radiofrequency accommodations:

- Kazakstan "dirty" power standard adopted globally - maximum of 50 G/S units on Stetzerizer meter on building wiring. (www.stetzerelectric.com/)
- Daylighting should be encouraged. All new lighting installations must be low radiofrequency lighting e.g. properly engineered lighting with very low or no emission of Incidental or Unintentional RF. LED lights can be engineered to this standard, but many are not at this time and therefore emit high amounts of RF. (Additional benefits - LEDs are more energy efficient than fluorescent lighting and do not emit UV thereby allowing greater access for people with lupus.)
- Use of tiered lighting instead of dimmer switches (also saves energy).

See the Solutions page at www.electricalpollution.com for a more comprehensive list of steps to minimize RF exposure.

Supplementary Information

Please visit (http://apps.fcc.gov/ecfs/comment_search/input?z=iw0f and search proceedings 03-

137 and 12-357) to see the **over 300 comments from U.S. citizens pleading with the FCC to establish biologically-based safety limits for radiofrequency radiation** to replace the existing outdated thermally-based radiofrequency limits.

The 1500-page BioInitiative Report on RF/MW health effects was published in 2012. The authors are 29 scientists from ten countries. They reviewed thousands of studies showing interference with chemical processes in the body, implicating RF/MW in a whole spectrum of alarming effects including genetic damage, cancer, immune dysfunction, neurological injury, and infertility. The report can be found at www.bioinitiative.org. For people with radiofrequency sickness, these effects can be immediate and serious.

Cardiac arrhythmias can be caused by wireless technology. Recent replicated double blind studies show that a cordless phone base station operating at WiFi frequencies can cause cardiac arrhythmias in susceptible individuals. This short video discusses the cardiac effect that wireless can have- https://www.youtube.com/watch?v=_EI9fZX4iww. View this video https://www.youtube.com/watch?v=sv1E9IXUd6Mto see further discussion. You can read the studies at http://www.magdahavas.com/wordpress/wp-content/uploads/2012/01/Havas-HRV-Ramazzini.pdf and http://www.ncbi.nlm.nih.gov/pubmed/23675629#. Obviously, for susceptible people (like those of us with radiofrequency sickness), WiFi can make whole buildings inaccessible and unsafe. A recent study in rabbits found that not only did WiFi change heart function parameters, but it dramatically changed the cardiac effects of both dopamine and epinephrine: Saili L, et al. *Effects of acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit.* Environmental Toxicology and Pharmacology 40 (2015) 600–605. This should be of great concern since WiFi has become ubiquitous in medical settings and may compromise the effectiveness of essential medical interventions, especially for people with radiofrequency sickness. **Medical care is considered to be a basic human right, but people with radiofrequency sickness can no longer access it without potentially endangering their lives or at least experiencing severe functional impairment.**

Causal connections between radiofrequency exposure and biological functional impairment. More recent papers look specifically at causality such as Pall ML *Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression.* J Chem Neuroanat. 2015

Aug 20. (http://www.sciencedirect.com/science/article/pii/S0891061815000599). It discusses the causal relationship between exposure to radiation from wireless technology and neuropsychiatric effects. Mechanisms of action are also discussed. Yakymenko et al discuss the fact that RF radiation is documented in numerous studies to cause oxidative damage and discusses mechanisms for bioeffects (Low intensity radiofrequency radiation: a new oxidant for living cells in Oxid Antioxid Med Sci 2014; 3(1):1-3) (http://www.sciencedirect.com/science/article/pii/S1382668915300594).

This case report documents the serious neurological functional impairment that exposure to radiation from wireless technology can cause. Johansson O and Redmayne M *Exacerbation of demyelinating syndrome after exposure to wireless modem with public hotspot* Electromagnetic Biolology and Medicine (http://dx.doi.org/10.3109/15368378.2015.1107839**).**

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) sets radiofrequency (RF) exposure limits for Europe that are similar to what the IEEE sets for

the U.S. According to ICNIRP, FCC guidelines would not be protective for individuals with sensitivities/ impairments from low exposures of RF/MW. It is a scientific fact that even small amounts of these environmental exposures are harmful to some. ICNIRP stated the following: "*Different groups in a population may have differences in their ability to tolerate a particular NIR (non-ionizing radiation) exposure. For example, children, the elderly, and some chronically ill people might have a lower tolerance for one or more forms of NIR exposure than the rest of the population. Under such circumstances, it may be useful or necessary to develop separate guideline levels for different groups within the general population, but it may be more effective to adjust the guidelines for the general population to include such groups. Some guidelines may still not provide adequate protection for certain sensitive individuals nor for normal individuals exposed concomitantly to other agents, which may exacerbate the effect of the NIR exposure, an example being individuals with photosensitivity.*" from ICNIRP STATEMENT,

GENERAL APPROACH TO PROTECTION AGAINST NON-IONIZING

RADIATION PROTECTION, (HEALTH PHYSICS 82(4):540-548; 2002)
(https://www.icnirp.org/documents/philosophy.pdf)

In light if this statement and all the other evidence, it is time that accessibility guidelines for hospitals, medical facilities, and other essential government buildings prohibit the presence of facility provided WiFi and other wireless transmissions within the facility. Medical records, electronic data, and the internet can be accessed perfectly well (and far more securely) using dedicated communication cables. Our doctors office has used electronic records for years which they accessed using direct cabled connections which they plugged their laptop into upon entering the office.

The Threat to Public Health Posed by Wireless Technology Makes Elimination of Wireless from Public Buildings, Hospitals, Medical Facilities, Schools, and Public Places a Very Reasonable Accommodation

The following links are of interest in spite of the fact that they relate to public health since they help with understanding that the accommodations needed for people with radiofrequency sickness are actually beneficial for public health. Wireless technology not only restricts accessibility for people with radiofrequency sickness, it jeopardizes public health.

U.S. National Toxicology Program (NTP) recently released findings that the radiation utilized by wireless technology is carcinogenic and breaks DNA. A replicated European study found that wireless radiation is also a cancer growth promoter. This excellent article by the Environmental Health Trust (http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/) provides a good overview of the carcinogenicity findings.

International Scientists Appeal to U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology (http://www.EMFscientist.org) "Today 190 scientists from 39 nations submitted an appeal to the United Nations, UN member states and the World Health Organization (WHO) requesting they adopt more protective exposure guidelines for electromagnetic fields (EMF) and wireless technology in the face of increasing evidence of risk. These exposures are a rapidly growing form of environmental pollution worldwide."

Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates by Norm Alster. (http://ethics.harvard.edu/files/center-for-ethics/files/%20capturedagency_alster.pdf) A damning report reinforcing the contention of

the International Scientist Appeal to the U.N. that regulatory agencies and standard-setting boards are not listening to researchers - read why this is happening in the U.S.

FCC Not Enforcing Existing Inadequate Radiofrequency Limits A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (http://www.marketwire.com/press-release/-1770139.htm). A Wall Street Journal investigation (http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.

The International Agency for Research on Cancer (IARC), a committee of the World Health Organization, has classified RF radiation, including that emitted by wireless technology, as a class 2B carcinogen. http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf.

"Electromagnetic Radiation, Health and Children 2014" by Dr. Erica Mallery-Blythe (https:// www.youtube.com/watch?v=sNFdZVeXw7M) is a must-watch presentation about the hazard that RF radiation emitted by wireless technology poses to children. Dr. Mallery-Blythe does an excellent job of presenting the information in an interesting, coherent, and accessible way, but with enough detail to justify immediate action to minimize children's exposure to radiation from wireless technology.

Department of Interior: **"the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today."** (http://www.ntia.doc.gov/files/ntia/_us_doi_comments.pdf)

RF radiation disrupts the endocrine system:

- Klaus Buchner and Horst Eger. Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields A Long-term Study under Real-life Conditions. Original study in German: BUCHNER K, EGER H (2011) Umwelt-Medizin-Gesellschaft 24(1): 44-57. http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf
- Eskander EF, Estefan SF, Abd-Rabou AA. How does long term exposure to base stations and mobile phones affect human hormone profiles? Clinical Biochemistry 45 (2012) 157–161

RF radiation alters heart electrical activities and causes ventricular enlargement in rats. Additionally, "The histopathological examination revealed hypertrophy, fragmentation and vacuolation of the myocardium, which were directly proportional to the exposure time." Fatma A. Mohamed, Azza A. Ahmed, Bataa M.A. El- Kafoury, & Noha N. Lasheen. **Study Of The Cardiovascular Effects Of Exposure To Electromagnetic Field**. Life Science Journal. 2011;8(1):260-274. These findings have enormous implications for cardiac health in a chronically RF exposed population.

Catherine Kleiber

December 15, 2016

Dear Ms. Walker,

Thank you for your attention to my comments. My main interest in critiquing the FirstNet PEIS documents is making sure that the environmental and health effects of the radiofrequency (RF) radiation that the wireless component of FirstNet will emit are appropriately factored into decisions about how to implement FirstNet. I address the serious deficiencies below. (Page numbers listed originate from Volume 1 Chapter 2 Draft Programatic Environmental Impact Statement for the Central United States, but the critique should be broadly applicable to the RF radiation section for all four regions.)

There were seriously inaccurate statements made about the safety level assured by existing FCC RF radiation limits:

> p. 2-10 "For 20 years, the regulatory levels for human exposure to RF emissions have been established by the FCC as a means of protecting both workers and the general public from any potential effects."
>
> p. 2-12 "These limits are based on thermal effects (i.e., the amount of RF energy required to heat tissue). According to the FCC, the established limits are well below levels that are considered to have adverse health effects."

Other government officials dispute claims such as these that FCC RF radiation limits provide sufficient population-based protection from harm during continuous exposures. The Department of Interior (DOI) said "**the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today**" (http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf), clearly indicating that they do not consider FCC RF radiation limits to be "protecting both workers and the general public from any potential effects" as the PEIS states.

Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, makes it clear in his correspondence with the EMR Policy Institute that "The FCC's current exposure guidelines, as well as those of the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-ionizing Radiation Protection, **are thermally based, and do not apply to chronic, nonthermal exposure situations**. They are believed to protect against injury that may be caused by acute exposures that result in tissue heating or electric shock and burn. The hazard level (for frequencies generally at or greater than 3 MHz) is based on a specific absorption dose-rate, SAR, associated with an effect that results from an increase in body temperature. The FCC's exposure guideline **is considered protective of effects arising from a thermal mechanism but not from all possible mechanisms.** Therefore, the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified." (emphasis added) (http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf) This very credible evidence is unmentioned and ignored.

As Mr. Hankin makes plain above, the FCC RF radiation limits are not protective from all adverse effects only those from thermal mechanisms during acute exposures, so the second sentence of the

quote from the PEIS (p 2-12), and copied above, is an implicit lie. Whether this is intentional or inadvertent, it should be corrected. FCC RF radiation limits are based on thermal effects in a large male. They are not population-protective. They do not and were never intended to protect from biological effects or even thermal effects during the chronic exposures we all experience today and which FirstNet would increase.

Even ICNIRP acknowledges the need to adjust their RF radiation guidelines (referred to here as NIR): "*Different groups in a population may have differences in their ability to tolerate a particular NIR (non- ionizing radiation) exposure. For example, children, the elderly, and some chronically ill people might have a lower tolerance for one or more forms of NIR exposure than the rest of the population. Under such circumstances, it may be useful or necessary to develop separate guideline levels for different groups within the general population, but it may be more effective to adjust the guidelines for the general population to include such groups. Some guidelines may still not provide adequate protection for certain sensitive individuals nor for normal individuals exposed concomitantly to other agents, which may exacerbate the effect of the NIR exposure, an example being individuals with photosensitivity.*" from ICNIRP

STATEMENT, GENERAL APPROACH TO PROTECTION AGAINST NON-IONIZING

RADIATION PROTECTION, (HEALTH PHYSICS 82(4):540-548; 2002)
https://www.icnirp.org/documents/philosophy.pdf

After the release of the U.S. National Toxicology Program (NTP) findings showing that non-thermal RF radiation exposures cause DNA breakage and cancer, the Institute for Electrical and Electronics Engineers (IEEE) posted an article with comments from Kenneth Foster of the IEEE committee that reviews RF radiation exposure limits:

> *With the NTP study results, Foster expects more governments to put out cautionary guidelines and radiation labeling for cellphones. He says he wouldn't be surprised if California adds RF radiation to its Proposition 65 list of carcinogenic chemicals, and if the IARC ups its classification rating from 2B: possibly carcinogenic to humans to 2A: probably carcinogenic to humans. "And they wouldn't be out of line in doing that," he says. "This is going to change the rhetoric in the field. People can point to much more hard evidence that [cellphone RF exposure] really is a problem."*
> (http://spectrum.ieee.org/the-human-os/biomedical/ethics/cellphone-radiation-causes-cancer-in-rats)

Th omission of the U.S. NTP findings from the PEIS RF radiation section is a very serious one and should be remedied. FirstNet cannot argue the U.S. National Toxicology Program is not a sufficiently reputable.

P. 2-18 "However, the BWG [BioInitiative Working Group] itself has been criticized by other scientific, professional, and governmental bodies for ignoring conflicting, inconsistent, or other credible evidence that clashed with its report (e.g., (Dolan, M. and J. Rowley, 2009))." The BioInitiative Working Group, a group of researchers and public health experts, are criticized in this quote with attribution to a paper written by representatives of telecom industry interest groups. This is analogous to dismissing the body of research on the health effects of tobacco, asbestos, or lead paint due to a critique by industry representatives. This was done for years and we have now seen what a mistake it was to allow it. Hundreds of thousands of people lost their lives due to the regulatory delays that resulted from allowing industry to dismiss research

critical of it. This article is not different. If its opinions warrant inclusion in the PEIS at all, they should be clearly attributed as representing the telecom industry. This was definitely not done.

On p. 2-12, studies are cited as finding that even with roof-top antennas, measurements inside those buildings are low compared to FCC limits, scant comfort since we already established that the government knows that the FCC limits are "...**now nearly 30 years out of date and inapplicable today."**

Discussion about findings of widespread violations of FCC limits are omitted from the discussion, but are highly relevant and should be included. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF radiation limits and rampant violations (http://www.marketwired.com/press-release/-1770139.htm). A Wall Street Journal investigation (https://www.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.

The fact that the FCC is incredibly lax, even negligent, in taking regulatory action even when violations are reported, never mind going out and conducting unannounced spot inspections, should be of great concern and should be a factor considered in the PEIS.

Additionally, these studies are old and date to a time when few people used wireless in many areas and there were many fewer antennas. One major failing of the FCC limits that merits discussion in the PEIS is the fact that they govern each antenna separately. Collocations result in much higher RF radiation levels around the site because each antenna still broadcasts at the same level as if there were no collocation. Transmission from other antenna sites and mobile devices further increase ambient exposure levels. This must be discussed in the PEIS as an environmental impact since the purpose of the broadband provision portion of FirstNet's mission mentioned on p. 2-8 is to encourage the use of wireless technology which will in turn increase the ambient RF radiation levels from both devices and base station antennas. In the example on p. 2-14, each antenna produces a field of 477μW/m^2 at ground level, but collocation of 4 such arrays (which is not uncommon) would result in 1,908 μW/m^2 at ground level. This is still below the FCC RF radiation limits, but which we established above are outdated and meaningless according to the DOI and not protective in chronic exposure situations according to the EPA. Even 477μW/m^2 exceeds levels shown in studies to cause biological effects, specifically negative effects related to sleep, stress, immune function, brain cancer, breakage of the blood-brain barrier, other cancers, reproduction, and oxidative damage. A ground level of 1,908 μW/m^2 exceeds levels shown in studies to cause heart effects and calcium metabolic effects (http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf). Thus, surrounding areas will certainly be exposed to high enough RF radiation levels on the ground to cause serious biological effects. RF radiation levels in portions of neighboring buildings elevated above ground level are likely to be even higher.

On p. 2-11, there is a list of "Some of the major problems with demonstrating cause and effect for RF" which seem to be cited as excusing FirstNet from an obligation to take action to protect the public and the environment. Each point is addressed below.

"*No consistent measures of exposure. Exposure is changing with the proliferation of cell phone*

use, and there is no real unexposed or "control" population (Ahlbom et al., 2004) (Khurana et al., 2010)"

While the absence of a control population cannot be used to justify inaction, it does support the high level of urgency to making sure that public health policy and regulations related to RF radiation exposure are sufficiently protective since **everyone is exposed**. Exact continuity of exposure measurement is not necessary between studies as long as care has been used within each study to be consistent. Studies show that RF radiation has very serious biological effects at levels far below existing FCC RF radiation limits. Below are some examples of serious clinically important biological effects resulting from real-life RF radiation exposures:

Cardiac arrhythmias can be caused by wireless technology. Recent replicated double blind studies show that a cordless phone base station operating at WiFi frequencies can cause cardiac arrhythmias in susceptible individuals. This short video discusses the cardiac effect that wireless can have- http://www.youtube.com/watch?v=_EI9fZX4iww. View this video https://www.youtube.com/watch?v=sv1E9IXUd6M to see further discussion. You can read the studies at http://www.magadahavas.com.wordpress/wp-content/uploads/2012/01/Havas-HRV-Ramazzini.pdf and http://www.ncbi.ntm.nih.gov/pubmed/23675629# . Obviously, for susceptible people (like those of us with radiofrequency sickness), WiFi can make whole buildings inaccessible and unsafe. A recent study in rabbits found that not only did WiFi change heart function parameters, but it dramatically changed the cardiac effects of both dopamine and epinephrine: Saili L, et al. *Effects of acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit.* Environmental Toxicology and Pharmacology 40 (2015) 600–605. A mouse cardiac study showed that mice exposed to RF radiation from a cellphone had significantly lower vitamin D levels, low calcium, low antioxidant capacity, low cardiac tissue MDA and elevated renin levels compared to controls. They also had enlarged left ventricles and ECG abnormalities (Fatma 2011). Both these cardiac effects are pre-disposing factors toward cardiac arrest. Obviously, these serious cardiac effects caused by RF radiation exposures from consumer devices ought to be discussed in the PEIS, since FirstNet will be promoting their use and emitting radiation levels from its antennas comparable to these exposures.

Cancer levels around antennas are elevated and FirstNet will either be elevating already heightened risks by adding collocation antennas, increasing emissions of existing antennas by increasing use, or putting up new towers and increasing cancer risk in those around them. This should be discussed in the PEIS. "*The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer*" (http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18) found significant increases in cancer risk at RF radiation levels below FCC RF radiation limits.

Other studies have as well. These merit serious consideration in the FirstNet PEIS and should not be omitted. Anything that will increase cancer risk for a large segment of the population should be considered very carefully. A review by Dr. Cherry (2000). Criticism of the Health Assessment in the ICNIRP Guidelines for Radiofrequency and Microwave Radiation (100 kHz-300 GHz) http://www.electricalpollution.com/documents/Cherry2000EMR_ICNIRP_critique_09-02.pdf discusses common errors in understanding about RF radiation exposures and studies and is, as

its title states a criticism of ICNIRP.

Radiofrequency radiation exposure causes important endocrine changes. *"Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions"* (http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf) is an important study documenting hormonal changes in residents before installation of a cellphone antenna and for a year and a half afterward. They found initial hormone level increases consistent with a stress response to RF radiation exposure levels as low as 60µW/m2. Initially adrenaline and noradrenaline increased and dopamine and phenylethylamine (PEA) levels decreased. While adrenaline and noradrenaline did decrease, dopamine and PEA levels never returned to pre-base station levels, remaining substantially lower during the year and a half of the study. According to the authors "This is of considerable clinical relevance because psychiatric symptoms also exhibit altered PEA levels. In Rimbach, the increase in sleep problems, cephalgia, vertigo, concentration problems, and allergies could be clinically documented after the cell phone base station had been activated. The newly developed symptoms can be explained clinically with the help of disturbances in the humoral stress axis." These long-term debilitating effects of cell towers must be mentioned in the PEIS and weighed in the decision making about how to move forward with FirstNet.

"How does long term exposure to base stations and mobile phones affect human hormone profiles?," Eskander et al. (http://www.sciencedirect.com/science/article/pii/S0009912011027330) is a very important study which documented hormonal changes occurring over time with chronic exposures to base station antennas or cell phones. It is extremely important that ACTH, cortisol, and T4 were significantly reduced in exposed individuals compared to controls. So were testosterone, progesterone, and prolactin. These effects became more pronounced over time. Endocrine disruption is extremely important clinically and should be considered as an extremely negative effect of the planned wireless portion of FirstNet. It should not be omitted from the FirstNet PEIS.

"*No scientifically agreed upon biological mechanism for harm. The lack of a clear biological mechanism increases uncertainty into whether the health end point that the study examined is the correct endpoint to try and measure (Hauri et al., 2014) (Ahlbom et al., 2004)*"

Agreed upon by whom? The telecom industry? There are two mechanisms by which RF radiation produces biological effects that are currently well-supported by research literature.

One is oxidation caused by RF radiation exposure (https://www.ncbi.nlm.nih.gov/pubmed/26151230). Oxidation can occur even with non-ionizing radiation exposure. At least 93 studies have now found that RF radiation has oxidative effects. Oxidation has important biological effects. Yakymenko states "In addition, ROS at relatively low concentrations can modulate inflammation via activation of NF-kB pathway (Hayden and Ghosh, 2011). Therefore, even subtle exposures to RFR with generation of hardly detectable quantities of free radicals can have their meaningful biological consequences." This is because "free radicals/ROS are an intrinsic part of the cellular signaling cascades." Increasing

population-wide exposure to an unavoidable oxidant will have profound effects on public health and the environment and should be discussed and weighed appropriately in the FirstNet PEIS.

The second is the ability of non-thermal levels of RF radiation to cause voltage-gated Ca^{2+} ion channels to open inappropriately. This can have profound and detrimental biological effects because Ca^{2+} is utilized in many cellular and intercellular systems as a messenger, meaning that when the voltage-gated Ca^{2+} ion channel opens inappropriately it sets off a cascade that affects metabolic activities within the cell or body.

Not only is Ca^{2+} efflux well-documented in the literature, but a reasonable mechanistic explanation for how very low RF radiation levels can cause voltage-gated Ca^{2+} channels to open is elucidated by Dr. Martin Pall in *Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor, Current Chemical Biology*, 2016, Vol. 10, No. 1., as follows:

"*The voltage sensor opens the ion channel due to the action of changes in the electrical force across the plasma membrane acting directly on these 20 voltage sensor charges [8]. The structure of the VGCC voltage sensor is discussed in more detail in the Discussion section below. It is plausible, therefore, that the electrical forces of these low intensity EMFs act through their electrical effects on the voltage sensor to activate the VGCCs. It is predicted that the forces on the 20 charges in the VGCC voltage sensor are highly amplified because of two important factors [2]. The law of physics called Coulomb's law predicts that forces on charged groups are inversely proportional to the dielectric constant of the medium in which the charges occur. Because the dielectric constant of the aqueous phases in the cell or extra- cellular medium are about 120 times higher than the dielectric constant of the lipid bilayer [2], this predicts that forces on the each of the 20 charges of the voltage sensor are about 120 times higher than are electrical forces on singly charged groups in the aqueous phases. In addition, Sheppard et al. [10], predicted that the electrical forces produced by EMFs across the plasma membrane are amplified about 3000-fold compared with the forces in the aqueous phases because of the high electrical resistance of the plasma membrane. It follows from this, that the forces on the voltage sensor are estimated to be vastly increased as compared with forces on aqueous phase single charges, where most if not all charged groups occur:*

20(# of charges in voltage sensor) X 120 (from the dielectric constant) X 3000 (amplification at the plasma membrane) = 7.2 million

Because of this, the electrical forces placed on the voltage sensor by these EMFs is calculated to be approximately 7.2 million times higher than are the forces placed on singly charged groups located elsewhere in the cell because these singly charged groups are predominantly in the aqueous phase [2]. It is highly plausible, therefore, that this extraordinary sensitivity of the voltage sensor to such weak electrical effects is the final answer to this long puzzle of how such low intensity EMFs can produce biological effects in many animals, including humans."

This important mechanism explains many of the biological effects RF radiation can have at levels far below the outdated FCC RF radiation limits and far below the levels that FirstNet would emit. Obviously this should be discussed in the PEIS and provides reasons for modifying the execution of FirstNet.

"*Some potential effects of major concern are rare, such as brain cancer and acoustic neuroma, both of which have been potentially linked to RF exposure. If the health outcome is rare, it is*

even harder to demonstrate cause and effect (Ahlbom et al., 2004)."

Even rare effects are significant when the whole population is being exposed to the causal agent. The early study cited here likely contain gross underestimates of the effect of RF radiation exposure on brain cancers and acoustic neuroma due to the long latencies normally involved in brain cancers (30-40 years). That studies are already finding effects should highlight the truly dangerous nature of RF radiation as a carcinogen. The U.S. NTP study should be discussed here. It found that non-thermal levels of RF radiation break DNA (considered the hallmark of a carcinogen) and increases the risk of glioma of the brain and heart (https://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/). Furthermore, rates of Glioblastoma Multiforme, a type of glioma, is increasing 1.3%-2.3% per year over a 15-year period, which was statistically significant (http://microwavenews.com/news-center/ntp-and-brain-tumor-rates). Thus, controlled lab studies and epidemiological findings are in agreement. A replicated European study found that RF radiation promotes cancer growth, supporting the carcinogenicity of RF radiation (Lerchl, et. al., 2015 https://www.ncbi.nlm.nih.gov/pubmed/25749340). Exposures were non-thermal and well-below existing FCC RF radiation limits. These findings, especially taken together, should carry a lot of weight and strongly suggest the need for precaution, especially with the studies above showing that cellular base station antennas cause increases in cancer. They must be included in the Firstnet PEIS. Research findings are sufficiently strong now related to carcinogenicity that former IARC panelists like Dr. Dariusz Leszczynski warn that RF-EMF should be classified as a Group 2A carcinogen, and Dr. Lennart Hardell reports that several studies indicate a Group 1 classification is justified, placing RF- EMF in the same category as tobacco, asbestos, and benzene.

Dr. Dariusz Leszczynski MSc, DSc, PhD
https://betweenrockandhardplace.wordpress.com/2014/08/14/carcinogenicity-of-cell-phone-radiation-2b-or-not-2b/

> "*In conclusion, I consider that currently the scientific evidence is sufficient to classify cell phone radiation as a probable human carcinogen – 2A category in IARC scale. Time will show whether 'the probable' will change into 'the certain'. However, it will take tens of years before the issue is really resolved. In the mean time we should implement the Precautionary Principle. There is a serious reason for doing so*."

Dr. Lennart Hardell MD, PhD https://www.ncbi.nlm.nih.gov/pubmed/24192496

> "*Based on the Hill criteria, glioma and acoustic neuroma should be considered to be caused by RF-EMF emissions from wireless phones and regarded as carcinogenic to humans, classifying it as group 1 according to the IARC classification. Current guidelines for exposure need to be urgently revised*."

These opinions are important because these researchers were among the IARC panelists that decided in 2013 only to classify RF radiation as a class 2B carcinogen and now they consider the evidence significant enough to warrant changing the classification to "probably carcinogenic" or even carcinogenic. The U.S. NTP study results have been released since these statements were made, probably further weighting them in the direction of carcinogenicity. These factors should definitely be discussed in the PEIS. They should also have real influence over whether the scope of the FirstNet project should be adjusted.

On pages 2-19 to 2-20 serious effects of RF radiation and RF infrastructure are discussed and

dismissed in a bizarre manner. Nine studies showing harm to bird populations via a variety of mechanisms are discussed, including reproductive failure. Then two laboratory studies showing reproductive failure in chickens are discussed "*Laboratory studies conducted with domestic chicken embryos have shown that emissions at the same frequency and intensity as that used in cellular telephones have appeared to result in death (DiCarlo et al., 2002) (Manville II, A., 2007).*" Then the idea that these studies show that low level RF radiation emissions support the findings in the environmental studies is ridiculed because "*given the controlled nature of the studies and potential exposure differences in the wild, this causation is left to interpretation and extrapolation.*" This is a case where bird epidemiological findings and bird lab studies are in agreement. Thus, the evidence show that towers affect birds negatively, at least reproductively. This should be given great weight. FirstNet should be adjusting its plans accordingly.

RF radiation kills and damages trees

Very little attention is paid to tree studies. This is an egregious oversight. We rely on trees for the very health of our planet. Trees are being killed and damaged across the U.S. and world-wide by RF radiation even without full-scale implementation of either FirstNet or 5G . RF radiation is being implicated as the cause. Several studies show the very serious effects that RF radiation has on the health of trees. Trees are essential to the welfare of the global environment and the continuation of the human race. They convert carbon dioxide into oxygen for us and purify our air. These are essential services. They also cool and provide shade in our cities and countryside. Additionally, they provide important wildlife habitat. Decimation of the Amazon rainforest by direct human actions has been oft-cited as endangering the global environment. FirstNet should not be moving forward with plans to increase RF radiation exposure in urban or rural areas since it will hasten the RF radiation-induced death of our urban and rural forests. We cannot afford additional forest die-off. Large mature trees are being seriously damaged and killed, this damage will take 50 years or more to repair. The references listed below clearly show that RF radiation has detrimental effects on tree health at levels far below the outdated FCC RF radiation limits.

- Radiofrequency radiation injures trees around mobile phone base stations https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations
- Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations https://www.hindawi.com/journals/ijfr/2010/836278/
- Tree damage in the vicinity of mobile phone base stations http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf
- The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf

The damage to trees is not theoretical. We are seeing it on our farm now. We have seen it in the city for years, but now we are seeing it in the country as well, on a widespread basis. Please see attached file. The damage is becoming serious and widespread. The nation's trees cannot survive continued chronic increases in RF radiation levels such as FirstNet would bring through direct infrastructure-induced increases and increases caused by increased utilization and greater numbers of devices.

Please read the following reports which demonstrate that wireless technology is causing serious

harm to wildlife:

"The Report on Possible Impacts of Communication Towers on Wildlife Including Birds and Bees" commissioned on 30th August 2010 by the Ministry of Environment and Forest, Government of India http://www.moef.nic.in/downloads/public-information/final_mobile_towers_report.pdf

"Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem – a review" http://www.biolmedonline.com/Articles/Vol4_4_2012/Vol4_4_202-216_BM-8.pdf

Balmori, A. "Electromagnetic pollution from phone masts. Effects on wildlife," Pathophysiology (2009), doi:10.1016/j.pathophys.2009.01.007 http://www.ncbi.nlm.nih.gov/pubmed/19264463

The Supreme Court of India ordered cell towers removed from schools, colleges, hospitals and playgrounds in Rajasthan because of radiation being "hazardous to life." The court's amazing 200+ page decision thoroughly reviews the worldwide evidence that cell towers are harming human beings and wildlife (http://timesofindia.indiatimes.com/city/jaipur/No-mobile-towers-near-schools-hospitals-directs-Rajasthan-HC/articleshow/17399705.cms).

On July 5, 2013 the Supreme Court of India upheld this decision.

None of these are mentioned in the PEIS. They are of great relevance.

The PEIS also did not mention the fact that increasing RF radiation exposure would increase RF radiation-induced functional impairments, violating the rights of those already experiencing serious effects from RF radiation (RF radiation sickness - see http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge_1969.pdf). Furthermore, FirstNet would be in violation of the 2008

ADA Amendments, causing further exclusion from society and greater levels of disability for those already experiencing RF radiation sickness and increasing the numbers of people developing RF radiation sickness since it is caused by chronic over exposure to RF radiation. The only cure for RF radiation sickness is avoiding exposure and the wireless broadband portion of FirstNet would make that virtually impossible. I have attached a comment I made to The National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR) regarding the need for the elimination of wireless from public places, public buildings, and medical facilities. Numerous other people also made comments. My comment also has relevance for ensuring that wired FirstNet infrastructure does not cause additional disability by causing "dirty" electricity. I hope that FirstNet will steps to ensure that its systems do not cause "dirty" electricity.

As noted on p. 2-12, in 1996 the FCC was given the responsibility to "prescribe and make effective rules regarding the environmental effects of radio frequency emissions" (TCA, 104 Pub. L. 104), obviously it has not done this, as discussed above the rules are outdated and inapplicable. The FCC is in the process of updating them so the common practice of relying on compliance with FCC RF radiation limits as being sufficient for protection of health and the environment must end (see p.2-12). As discussed previously, until the FCC completes revision of the FCC RF radiation limits so that they are population- based biologically-protective RF radiation limits the FCC is in violation of their Congressional delegated responsibility to adopt

"uniform, consistent requirements, with adequate safeguards of the public health and safety" these were to be "established as soon as possible" (H.R. Report No. 104-204, p. 94). Unfortunately, it appears that the undue industry influence at the FCC documented in a report published by Harvard (http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf), may have compromised the agency's ability to promptly revise its RF radiation safety limits.

The need for biologically-based RF radiation safety limits is supported by the RF/EMF research community. Over 220 scientists have signed an appeal to the UN (www.emfscientist.org/).

The need for FirstNet to do its own due diligence is supported by case law. In Massachusetts v. E.P.A., 549 U.S. 497 (2007) Justice Stevens wrote for the majority that agencies cannot ignore Congresses command to regulate. Thus, the fact that FCC has abrogated its duty to maintain protective up-to-date RF radiation limits does not excuse FirstNet from having to consider the serious health and environmental consequences of its program in the PEIS and find a reasonable alternative to protect public health and the environment. In Scenic Hudson Preservation Conference v. Federal Power Commission, 354 F.2d 608 (2d Cir. 1965), cert. denied 384 U.S. 941 (1966), on appeal the Circuit Court pointed out (at p. 620) that Congress gave the FPC a broader responsibility.

The Scenic Hudson Court noted "In this case, as in many others, the Commission has claimed to be the representative of the public interest. This role does not permit it to act as an umpire blandly calling balls and strikes for adversaries appearing before it; the right of the public must receive active and affirmative protection at the hands of the Commission." This decision has obvious applicability to the need for FirstNet to act proactively to protect the health of the American people, as well as the environmental health, not just do a *pro forma* PEIS without real consideration of the great potential for harm that a portion of the FirstNet program has.

Given both the serious inadequacy of the FCC RF radiation limits and the potential for serious harm to public health and the environment that can result if FirstNet implements the program as originally envisioned, FirstNet needs to take steps to amend the program to prevent that harm.

Recommended reasonable modifications to FirstNet:

FirstNet must inform Congress of the health and environmental hazard posed by the RF radiation emission required for wireless broadband and request Congress to eliminate provision of wireless broadband internet from FirstNet's mission. As discussed earlier in this document, it is now acknowledged by government agencies, particularly the Department of Interior and the Environmental Protection Agency that the FCC RF radiation limits are not protective of the public during the chronic exposures experienced today. Furthermore, the U.S. National Toxicology Program has found that RF radiation damages DNA and causes cancer. These are sufficient reasons to halt the portion of the FirstNet Program aimed at increasing wireless broadband coverage and usage. Increasing wired, cabled, and fiber optic access to broadband could be substituted instead. Thereby, achieving a comparable result without causing public health or environmental problems.

For the same reasons, FirstNet should delay implementation of the wireless first responder's component until they design as system that provides good interoperable first responder communication while minimizing radiofrequency emissions from antennas and first responder's communicators. Thus, communicators should be able to contact each other directly, not require

an outside antenna (certain types of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed.

FirstNet should request that the NTP quickly undertake and complete toxicology studies comparing the different communication technologies, including, but not necessarily limited to, 3G, 4G, and 5G LTE technologies so that FirstNet can utilize the least toxic least biologically active technology for its first responder's interoperable communication system. Oxidative parameters and calcium efflux should be among the measures used.

Please make the necessary modifications to all the FirstNet Draft PEIS documents. Please also make the next versions more readily available. You should, for instance, include links to the different sections on your website so they can be readily located and downloaded.

Thank you.

Sincerely,

Catherine Kleiber

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RF Radiation From Wireless Technology Kills and Damages Trees

By Catherine Kleiber

Trees are being killed and damaged across the U.S. and world-wide even without full-scale implementation of 5G. RF radiation is being implicated as the cause. Several studies show the very serious effects that RF radiation has on the health of trees. Trees are essential to the welfare of the global environment and the continuation of the human race. Decimation of the Amazon rainforest by direct human actions has been oft-cited as endangering the global environment, the FCC should not be moving forward with implementing a technology, 5G wireless technology, that will hasten the RF caused death

of our urban and rural forests. Please read the following papers to see the toll RF is already taking on trees. We cannot afford additional forest die-off. Large mature trees are being seriously damaged and killed, this damage will take 50 years or more to repair.

- Radiofrequency radiation injures trees around mobile phone base stations https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations
- Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations https://www.hindawi.com/journals/ijfr/2010/836278/
- Tree damage in the vicinity of mobile phone base stations http://kompetenzinitiative.net/KIT/wp- content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf
- The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf

The damage to trees is not theoretical. We are seeing it on our farm now. We have seen it in the city for years, but now we are seeing it in the country as well, on a widespread basis.



July 24, 2016
Note thinness in tree on right and bare spot developing between trees (both cottonwoods)



September 12, 2016
More leaves lost. No sign of healthy fall leaf color so fall is not the



August 9, 2016
Damage progressing quickly



July 24, 2016
These cottonwoods trees began exhibiting damage similar to the trees above in 2015. Most of them greened up this spring, then had the leaves die and drop. Two still retain leaves low down. Others are completely dead.

As you can see the damage to trees is progressing quickly to death. Balimori discusses the fact that *"White and black poplars (Populus sp.) and willows (Salix sp.) are more sensitive. There may be a special sensitivity of this family exists or it could be due to their ecological characteristics forcing them to live near water, and thus electric conductivity."* Certainly the trees that are worst off in our area are willows and cottonwoods and they are growing in areas that are wet, but I have seen trees of all types exhibiting damage. Please think of the future. We cannot live without a healthy tree population. We rely on them for the very oxygen we breathe. **No technology is worth endangering something as essential as our source of oxygen.**



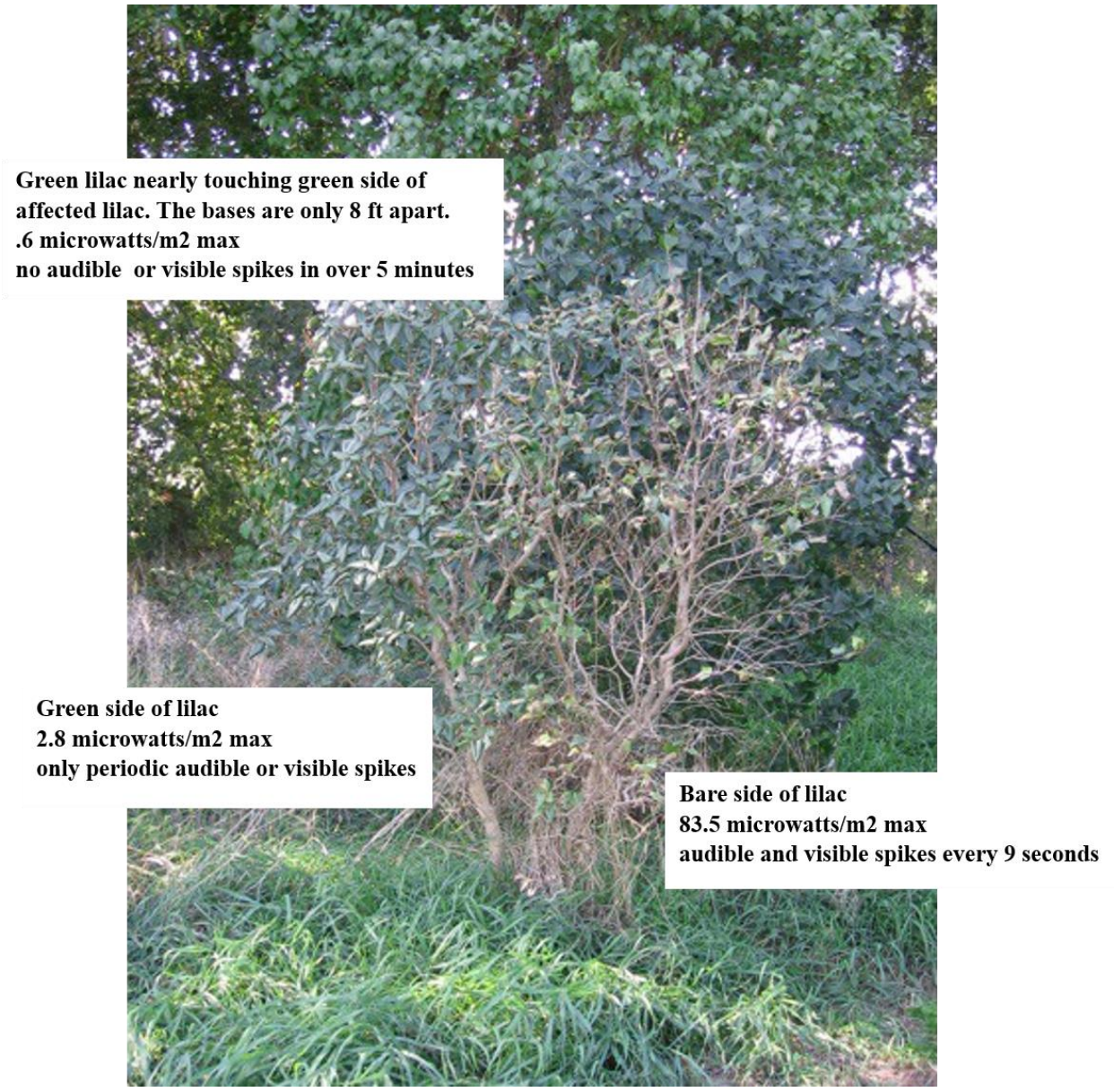


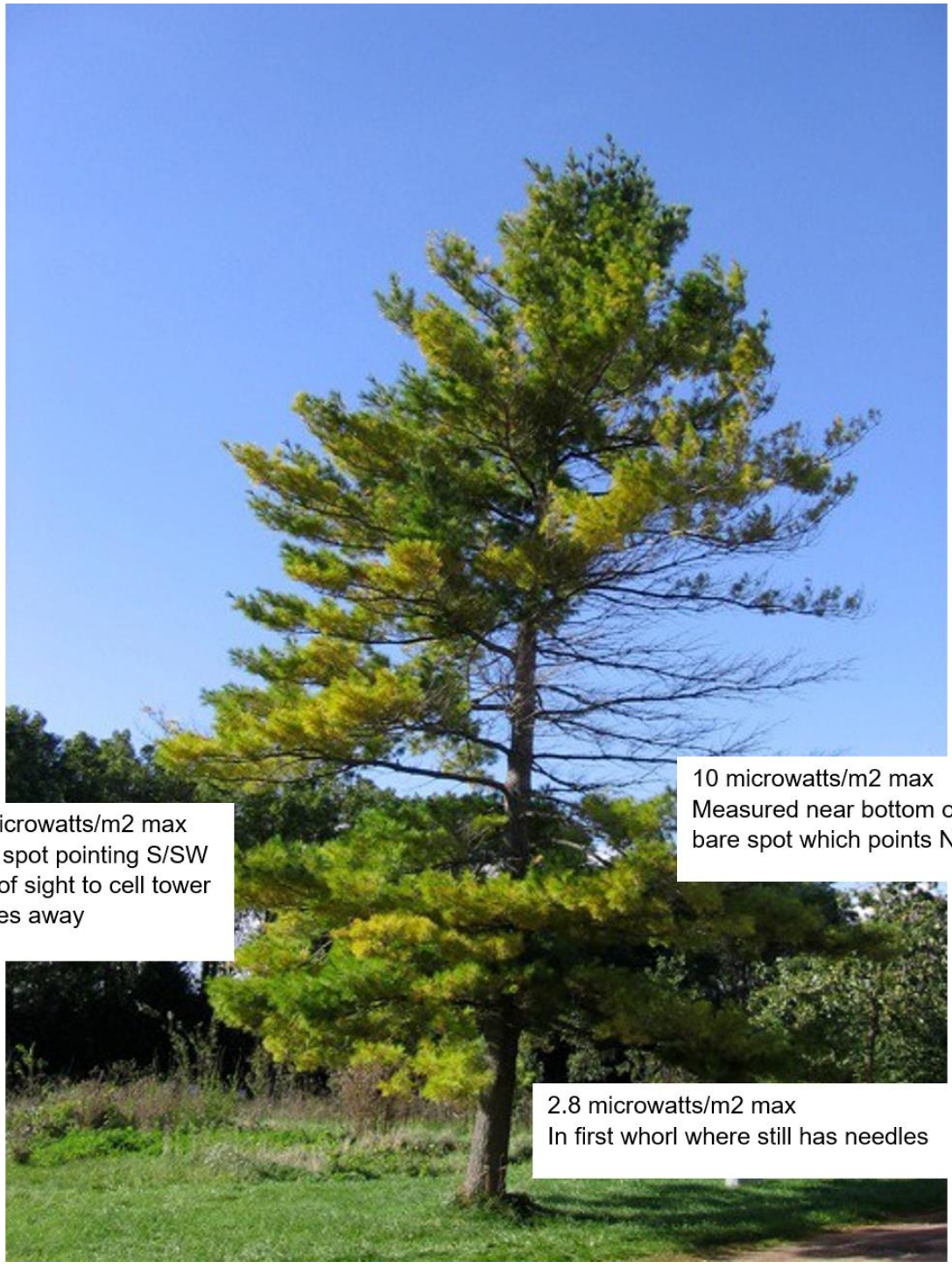
Notice necronic lesions and off color characteristic of RF damage. No normal fall color present, despite on-going leaf drop.



Note the small damaged leaves across the top of the tree. Trees of all different species around our yard are demonstrating this damage. Also mentioned in the aforementioned papers. We own no transmitters so all RF from outside sources.

Lilac showing marked one sided damage. Signal appears to be coming from a WiFi tower on a hill about a mile away.




39 microwatts/m2 max
Bare spot pointing S/SW
Line of sight to cell tower
6 miles away
10 microwatts/m2 max
Measured near bottom of
bare spot which points N
2.8 microwatts/m2 max
In first whorl where still has needles

Additional References Provided

Belyeav, Igor, Amy Dean, Horst Eger, Gerhard Hubmann, Reinhold Jandrisovits, Markus Kern, Michael Kundi, Hanns Moshammer, Piero Lercher, Kurt Müller, Gerd Oberfeld, Peter Ohnsorge, Peter Pelzmann, Claus Scheingraber, and Roby Thill. 2016. "EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses." *Reviews on Environmental Health*, 31(3): 363-397.

Havas, Magda. 2017. "When theory and observation collide: Can non-ionizing radiation cause cancer?" *Environmental Pollution,* 221(2017): 501-505.

Pall, Martin L. 2015. "Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression." *Journal of Chemical Neuroanatomy*, Volume 75, Part B, Pages 43-51.

_____. 2016. "Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium channels via Their Voltage Senor." *Current Chemical Biology*, 10(1): 74-82.

Unknown Author. 2003. *Permissible levels of high-frequency electromagnetic pollutions' voltage in a wires of industrial frequency alternating current Sanitary-epidemiologic norms*. Confirmed: The order of the Head State Sanitary Physician of the Republic of Kazakhstan. 28 November 2003.

Yakymenko, Igor, Olexandr Tsybulin, Evgeniy Sidorik, Diane Henshel, Olga Kyrylenko, and Sergiy Kyrylenko. 2015. "Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation." *Electromagnetic Biology and Medicine*, 35(2): 186-202.

Comments from Tara Schell

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From:

Sent: Thursday, December 15, 2016 10:50:53 AM

To: Genevieve Walker

Subject: Urgent: Comment on FirstNet Draft Environmental Impact Statements

I would like to re-butt your arguments based on personal experience and studies regarding your FirstNet Draft Environmental Impact Statements.

Please see attached two documents below:

I would like to re-butt your arguments based on personal experience and studies regarding your FirstNet Draft Environmental Impact Statements.

I also am requesting that Congress eliminate your provision of wireless broadband internet from FirstNet's mission and:

Delay implementation of wireless first responder's component until they design as system that provides good interoperable first responder communication while minimizing radiofrequency emissions from antennas and first responder's communicators

- Cancer findings with radios in first responders
- Cancer findings from cellphone radiation from NTP - https://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/

Thus, communicators should be able to contact each other directly, not require an outside antenna (certain types of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed.

There is direct evidence of human and environmental harm with thousands of modern studies that trump the old ones. Please read through the list of critiques below for a list of some of the most problematic points and omissions.

We (and the Department of Interior) were successful in getting FirstNet to complete a Programatic Environmental Impact Statement (PEIS).

The Central Region document is available at the following site:

https://www.regulations.gov/document?D=FIRSTNET-2016-0003-0001

The East Region

https://www.regulations.gov/document?D=FIRSTNET-2016-0002-0001

The South region is available for review and comment at the following link:

https://www.regulations.gov/document?D=FIRSTNET-2016-0005-0001

West Region

https://www.regulations.gov/document?D=FIRSTNET-2016-0004-0001 or https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&D=FIRSTNET-2016-0004

The documents are huge, **however the RF portion is tiny**. It is not dealt with throughout the documents. It seems to be in 2.4 which I believe means Chapter 2 section 4 for the two PEIS documents that I was able to obtain.

Here are my critiques:

RF health risks to workers, the population, and the environment are not addressed throughout the document - they are isolated to the RF section and quickly dismissed.

"*The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer*"
(http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18)

"Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions"
((http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July %202011.pdf)"*How does long term exposure to base stations and mobile phones affect human hormone profiles?*," Eskander et al. (http://www.sciencedirect.com/science/article/pii/S0009912011027330)

FirstNet wireless technology will be LTE 4G or higher. Toxicology studies should be done comparing 4G and other communications protocols so that first responders and the population are exposed to the safest.

FirstNet has created to allow first responders to communicate easily AND TO PROVIDE WIRELESS BROADBAND NATIONWIDE (2-8).

Contrary to their statement FCC regulations do not protect from "any potential effects," as this letter from Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, regarding the limitations and purpose of the FCC exposure standards notes (http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf) This very credible evidence is unmentioned and ignored.

FCC regulations are poorly enforced. (An issue which is completely ignored in the PEIS.) Rampant violations are documented by the Wall Street Journal and EMR Policy Institute. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (http://www.marketwired.com/press-release/-1770139.htm). A Wall Street Journal investigation (https://www.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.

A fully elucidated mechanism should not be required to take action to protect public health when detrimental effects are found. Serious biological effects are acknowledged and then ignored on page 2-20.

The two mechanisms that are extremely plausible and well-supported in the literature are completely ignored:

Oxidation -

1. Yakymenko, I., Tsybulin, O., Sidorik, E., et al. (2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. Electromagn Biol Med. Jul;7:1-16. http://www.ncbi.nlm.nih.gov/pubmed/26151230#

Ca 2+ channels

1. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard Recent Res Devel Mol Cell Biol 7.

Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. J Chem Neuroanat DOI: 10.1016/j.jchemneu.2015.08.001. http://dx.doi.org/10.1016/j.jchemneu.2015.08.001

Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1.

The PEIS uses outdated documents to excuse inaction.

Contrary to their assertion, FCC limits do not protect against adverse effects, even the DOI noted "**the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today**" (http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf)

The opening of the FCC docket to re-evaluate limits is acknowledged, but then ignored. The logical step of delaying implementation of the wireless component until that is completed is not even mentioned.

The National Toxicology Program findings are not even mentioned.

Their exposure calculations are based on only one antenna and work out to 477uW/m2, which is over the level shown to cause biological effects (http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects- From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf see graph at end). Most towers or building antenna sites have more than one antenna radiating in any given direction, plus signals come from other nearby sites, and the ground infrastructure such as cellphones, tablets etc. So levels at ground level are likely to be far higher than that and levels in apartments or homes which get a direct hit from neighboring buildings could be far higher depending on distance.

Several IARC panelists have made public statements that the evidence now shows that radiofrequency radiation should be classified as either a class 2A or class 1 human carcinogen. The recent (ignored) National Toxicology Program findings support this. This should cause the wireless portion to be stopped and FirstNet should explain why to Congress, but no mention is made and therefore no such action is recommended.

They refuse to take action to protect birds in spite of lab and epidemiological evidence that support each other in finding hard because it requires "interpretation and extrapolation."(2-20) Doesn't it always?

They hardly touch on tree damage and totally ignore the following tree and plant studies:

- Radiofrequency radiation injures trees around mobile phone base stations: https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations
- Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings:

Preliminary Observations https://www.hindawi.com/journals/ijfr/2010/836278/

- Review: Weak radiofrequency radiation exposure from mobile phone radiation on plants: http://www.ncbi.nlm.nih.gov/pubmed/27650031?dopt=Abstract
- Tree damage in the vicinity of mobile phone base stations: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf
- The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf
- Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. - **IMPORTANT MECHANISTIC DISCUSSION**

On 2-20 the PEIS acknowledges *"A number of other studies generally touch upon the nature of RF exposure and the disruption of biological processes that are fundamental to plant and animal growth and health, including but not limited to behavior, DNA damage, immune deficiencies, reproductive system effects, hormone dysregulation, degraded cognition and sleep, and desynchronization of neural activity (BioInitiative Working Group, 2012) (Balmori, A., 2005),"* **but then no protective action is being taken because** *"The common practice for NEPA documents related to cellular towers is to cite FCC standards and point to the fact that they would be built and operated according to allowable FCC RF emission limits. Some NEPA documents that have more directly addressed the RF emissions potential largely point to the existing literature and suggest that although there is evidence that RF emissions could potentially affect some species, the evidence is insufficient to support a finding of adverse impacts on these species due to RF emissions (Ballistic Missile Defense Organization, 2000) (FCC, 2012)."*

This approach was not allowable by the courts in other situations. Especially since the inadequacy of the FCC RF limits is now acknowledged by both the DOI and the EPA. In addition, numerous studies have added to the knowledge about the hazard that RF poses to human health since both 2000 and 2012, including the NTP study which has found that RF is carcinogenic and breaks DNA.

I am fully disabled from wireless damage and exposure. Wireless has also caused a hypersensitivity in me to all types of EMFs.

It is against the Nuremberg Treaty to experiment on us without informed consent and it is unconstitutional to take away basic human rights and freedoms from me. I can not work, drive, access most public places or medical facilities, and can not even live on my own property without exposure with wireless being spread everywhere. Millions of Americans are already disabled from EMFs and most can not even use a wired device anymore because their sensitivity is too high. You are destroying the health of America and the environment creating a large microwave oven cooking everything within it. Radio Waves do not end. They continue forever.

The younger generation that was raised with this technology is already severely damaged. Young kids, teenagers, and young adults are already disabled from EMFs and environmental toxins and can not go out in public without a complete meltdown from EMFs including EMFs found in artificial lighting (except incandescent which is the safest artificial lighting there is and

is the hardest to get now). I get contacts regularly from young adults and parents with kids who have no place to go or live without EMF exposure. Their lives have already been stripped from them. Disabling America and ruining our economy with all this sickness and medical issues is not the answer. Foreign countries are removing wireless from their cities and public places because it is a worldwide epidemic and they are having to pay out disability for it. Russia never allowed high amounts of radiation to begin with and told the world that these cell towers and RF levels were way too high. Will they be the only country left without damaged DNA to reproduce and without their whole country disabled, sick, economically collapsed and famined?

Wireless RF/EMFs reach everyone and everything 24/7. You can not opt out of it. It causes severe pain, brain fog, dementia, shuts down mitochondria and causes severe abnormal chronic fatigue, Parkinsons, Alzheimers, Diabetes type 3, shuts down kidneys/liver function, stops/paralyzes my heart, causes irregular heartbeat, anxiety, sharp painful heart jerking, rapid heart beat, cardiac arrest, headaches, joint pain, damages DNA, fertility, constant bleeding and severe abdominal pain, seizures, autism, ADHD, and so much more. It is the number one killer of bees and all pollinators along with birds, bats, frogs, etc. It makes animals and humans sick and destroys crops, trees, plants, etc as it weakens them and makes them more prone to sickness, disease, insect damage, etc.

It also increases mold both in your body and environment over 600 times including Lyme disease. There is now a mold epidemic due to all the wireless. When wireless hits mold, mold creates a self-defense against it and creates mycotoxins to survive. Mycotoxins are a chemical toxin that can be more deadly than mold itself and is still toxic will killed. It is too small to filter and extremely hard to kill but the dead spores are just as dangerous. Your body creates autoimmune disease the same way when wireless radiation hits your body to try to defend itself against the radiation poison. RF/wireless is a carcinogenic, neurotoxin and genotoxin.

Create safer technologies and safe zones where people can live with no wireless/RF radiation. Zone yourselves in and radiate only yourselves. Then when you are all dying from cancer, tumors, and sickness and have no more food after killing off all the pollinators, then let me know what ya think then?

I will be sending all my construction and medical bills to any company or government that causes radiation to be on my property. The answer isn't to cover up symptoms. The answer is to remove the problem. Just because there is a new technology, it does not mean that we have to use it. Every person who has a part in wireless deployments will be personally held accountable in court for the damage it has created as crimes against humanity and the environment. The law suits are coming!

I will attach a second word document with a list of videos, studies, medical information and more on the dangers of wireless radiation/EMFs along with a Worldwide list of wireless deactivation and removal that has already taken place due to this epidemic.

Citizen Fully Disabled from EMFs and Tired of Corrupt Companies Destroying Our Health, Children, and Environment:

Tara Schell

Virginia

Here are just a few links on the dangers of EMFs:

https://www.emfanalysis.com/

Engineer Discusses the Dangers of Wireless:

https://www.emfanalysis.com/new-paradigm-emf-science/
http://www.electricsense.com/
http://electricalpollution.com/
http://www.bioinitiative.org/
www.emfieldssolutions.com
www.powerwatch.org.uk
Radiation-Limits-at-Wireless-Antenna-Sites,16,3024
http://articles.mercola.com/sites/articles/archive/2010/02/09/new-study-confirms-electrical-pollution-from-cell-phones-and-wifi-is-hazardous.aspx

Recent US Government Study Showing Wireless Causes Cancer & Brain Tumors
http://www.saferemr.com/2016/05/national-toxicology-progam-finds-cell.html
http://microwavenews.com/news-center/ntp-nyt

Town in Italy Bans Wifi in schools:
https://www.thelocal.it/20160108/italy-town-turns-off-school-wifi-over-health-concerns

European Leaders Ban wifi in schools:
http://articles.mercola.com/sites/articles/archive/2011/06/02/european-leaders-call-for-ban-of- cell-phones-and-wifi-in-schools.aspx

France Bans wifi from schools & daycares:
http://francesfox.com/france-bans-wifi-school/
http://www.earthcalm.com/wifi-dangers-to-children-france-bans-wifi-in-nurseries

Canada schools Ban wifi:
http://www.safeschool.ca/School_Bans_WiFi.hml

More Bans:
http://www.wifi-in-schools-australia.org/p/worldwide.html

Quiet Zones:
http://www.emfs.com/article/emf-quiet-zones

EMFs & Bees, Birds, Bats, Insects, Frogs, & Pollinators
http://www.citizensforsafetechnology.org/bees-in-wildlife-and-environment,31,0
http://emfsafetynetwork.org/cell-phone-radiation-disturbs-honey-bees/
http://www.emfhealthalert.com/emf-and-the-bees/
http://rense.com/general81/emfs.htm
http://www.newmediaexplorer.org/sepp/2007/03/06/millions_of_bees_die_are_electromagnetic_

signals_to_blame.htm
http://apps.fcc.gov/ecfs/document/view?id=7520941855
http://naturalsociety.com/is-the-cellphone-killing-thehoneybee/
http://www.bibliotecapleyades.net/scalar_tech/esp_scalartech_cellphonesmicrowave.htm
http://www.shiftfrequency.com/tag/scalar-waves/
https://lindasepp.wordpress.com/mcs-and-housing/
http://www.stopumts.nl/doc.php/Berichten%20Internationaal/8317/electrohypersensitivity_sanctuaries
http://www.nettally.com/prusty/mcs.htm
http://www.ecolibria.com.au/electromagnetic-radiation-emr-and-potential-adverse-health-affects/
http://reesewellness.com/electromagnetic-wellness-destroyers/

EMFs and Mold/Mycotoxins:
http://agoodhealthadvocate.com/health/mold-produces-600-times-more-bio-toxins-with-emf/
http://www.electricsense.com/6580/emfs-indoor-mold-connection/
http://www.klinghardtacademy.com/
http://www.earthcalm.com/emfs-and-mold-a-deadly-combination
http://www.helladelicious.com/diy/2012/06/biofilms-parasites-mold-and-electromagnetic-frequencies/

Dangers of Mold:

http://articles.mercola.com/sites/articles/archive/2011/09/03/molds-making-you-ill.aspx

Mold, Lyme, and EMFs
http://www.betterhealthguy.com/a-deep-look-beyond-lyme

EMFs and Heavy Metals:
http://articles.mercola.com/sites/articles/archive/2012/08/25/heavy-metal-electromagnetic-fields.aspx

EMFs & Autism:

http://naturalhealthforlife.com/autism/electromagnetic-radiation-emf-autism-hidden-connection/

Smart Meters Blowing Up & Catching on Fire Video:
https://www.change.org/p/stop-new-york-state-wireless-smart-meter-program/u/16015406?tk=kfdvUq27cMO2C2KHvc_GLYEMyifgVTAEuya_XeZi3yc&utm_source=petition_update&utm_medium=email
http://smartmeterdangers.org/smart-meter-scientific-research/new-studies-niradiation/

Dangers of Smart Meters & EMFs:
http://stopsmartmeters.org.uk/prof-martin-pall-how-wifi-other-emfs-cause-biological-harm/
http://www.freedomtaker.com
http://stopsmartgrid.org/
http://citizensforaradiationfreecommunity.org/

Meter Differences & Electrical Engineer Report on their Dangers:

https://www.emfanalysis.com/do-you-have-a-smart-meter/
https://michiganstopsmartmeters.com/2016/10/12/the-meter-itself-is-the-hazardous-condition/

Take Back Your Power Video on Not So Smart Murder Meters:
https://www.youtube.com/watch?v=ETfiksb3H4k

5G Spectrum Video: https://www.youtube.com/watch?v=OMxfffqyDtc
http://www.parentsforsafetechnology.org/stop-5g-spectrum-frontiers.html
http://citizensforsafetechnology.org/Americans-Beware-Nationwide-Violations-of-FCC-
https://wearetheevidence.org/

Microwave Radiation Expert: Search Barrie Trower on youtube. Lots of videos available.
Wi-Fried Video:

https://www.youtube.com/watch?v=iTNYCMlgg7E

Jenny Fry Commits Suicide from Wifi in School:
https://www.youtube.com/watch?v=m6FcCtFAUcs

Israel's 3rd largest city bans wifi from schools:
Israel Video with English Subtitles discussing the epidemic of Wireless on our World titled "How we kill ourself –Radiation"

https://www.youtube.com/watch?v=bpJsIWuV-PA

How to Use the Cornet ED78s Scanning Meter taught by a Building Biologist:
https://www.youtube.com/watch?v=D64sr4kkbm8&feature=youtu.be
http://emfhelpcenter.com/

Radiation/EMFs Explained:
http://rense.com/general56/rad.htm
https://www.jackkruse.com/emf-5-what-are-the-biologic-effects-of-emf/
http://emwatch.com/what-emf-does-to-your-body/
http://www.americanassociationforcellphonesafety.org/
http://thepeoplesinitiative.org/
http://boilthefrogradio.com/kevin-mottus-joins-the-show/
http://www.saferemr.com/
http://articles.mercola.com/sites/articles/archive/2013/09/21/cell-phone-wifi-radiation.aspx#!

Dangers of Microwave Ovens:
http://naturalsociety.com/microwaves/
http://www.globalresearch.ca/the-dangers-of-microwave-radiation-cannot-be-ignored/24342
http://articles.mercola.com/sites/articles/archive/2010/05/18/microwave-hazards.aspx

Books:

Scientist Nick Begich "Angels Don't Play This Harp"

https://www.amazon.com/Angels-Dont-Play-This-Haarp/dp/0964881209

Tox-Sick by Suzanne Somers

- https://wh.gov/iewmv Petition: Please publicize the U.S. National Toxicology Program results that wireless radiation causes DNA breakage and cancer
- http://ehtrust.org/science/ facts-national-toxicology- program-cellphone-rat-cancer- study/ An excellent write-up about the NTP findings
- https://www.youtube.com/watch? v=DIlOVJd0lA8 Jimmy Gonzalez died at age 42 after he developed cancer where he was in contact with his phone: brain cancer, cancer under his chest pocket where he stored his phone, and cancer in the hand that held it.
- http://ehtrust.org/key-issues/ cell-phoneswireless/cell- phone-survivors/ Cell Phone Survivors & Non-Survivors
- www.EMFscientist.org Over 220 EMF/RF researchers from around the globe agree - existing RF limits are not protective and urgently need revision to protect people from getting cancer and other biological effects
- http://www.bioinitiative.org/ whats-new-2/ The response of the authors of the 2012 BioInitiative Report to the NTP findings.

If you have had cancer that you link to wireless technology or RF or know someone who has, please submit your story to:

https://www.whitehouse.gov/ webform/cancer-touches-all-us- share-your-story-here

Dangers of Blue Light:

All artificial lighting has blue light except old fashioned incandescent bulbs or red and purple lamps. Even LEDs have blue light.

"Morning sun has blue light in the spectrum, but it is balanced with the other colors in the sun so you get the exact amount you need to reset your circadian rhythm by getting out in the morning soon after rising and being grounded outside as well. No lenses should be worn for the 15 minutes you do this. This helps to reset melatonin as well.

Blue light doesn't just affect our eye clock, it also affects our skin surface, and our skin detects this color. Jack always recommends that if there is blue light exposure and you're inside, make sure your body is covered up from the blue light exposure, as well as your eyes. Outside, you take everything off if possible."

Here is an app for the computer to block the blue light: It will change the lighting to go down with the sun and in the apps section, you can make it more orange.

https://justgetflux.com/

Here is a blue light map to see how much there is where you live. You want to live in the darkest places possible and avoid as much light as you can especially at night:

http://www.lightpollutionmap.info/#zoom=10&lat=4647733&lon=-8861149&layers=B0TFFFF

Regular glasses to block blue light:

Zenni Opticals sells them. They shouldn't be worn out in the sunlight though because our eyes

need the full spectrum UV light. These lenses block all UV and blue light but have a clear lens.

You can get any style you want, and when you order them, you'll have the option to add Beyond UV to your glasses. You can get them in prescription and nonprescription.
http://www.zennioptical.com/beyond-uv-blue-blocker
Goggles to block blue light buy here:
https://www.amazon.com/Uvex-Blocking-Computer-SCT-Orange-S1933X/dp/B000USRG90
Here is some info on blue light from a friend:
"Jack Kruse believes that its the blue light that is at the heart of all health problems because it destroys DHA that is used by our mitochondria. Once the mitochondria doesn't work well, EMF problems loom large as well as other autoimmune conditions, cancer, etc. Once blue light is mitigated by using blue blockers, getting natural sunlight in our eyes, grounding outside barefoot, and setting our circadian rhythms right again, we can reverse the problems. In EMF fields he believes we need a LOT of fatty fish to replace our lost DHA.

Jack Kruse is really the top of the list when it comes to having information on blue light, non-native EMF, circadian biology and quantum biology. He is very wordy, and it takes a long time to read his work. He has a lot of videos online, and even podcasts you can follow. He's highly arrogant, but that's just his way.

You either like Jack or you don't.

Here is a list of different videos, podcasts, and links to his articles about blue light, and emf: http://jamiegward.com/2016/08/14/2-dr-jack-kruse-mitochondria-sunglight-quantum-biology/
https://www.youtube.com/watch?v=vAZR0tmhMqY
https://www.youtube.com/watch?v=VLmhs6dalok
These two videos were from this July in Vermont. Rubin and Jack give these talks. They would be good to watch first:

https://www.youtube.com/watch?v=wHDNW4qQI9I
https://www.youtube.com/watch?v=N-_DTk9hYvI
Here's his website:
https://www.jackkruse.com/
It's much easier to listen to him talk than to read his work. He does have a book as well available on his site. He doesn't seem to have a word quota and can just talk and talk."

Article on Lighting and Insulin Resistance:
http://www.naturalhealth365.com/insulin-resistance-blood-glucose-1939.html

Worldwide Actions on Cell Phones/Wireless Radiation

Government Actions on Cell Phones/Wireless Radiation

Snapshot of the item below:



INTERNATIONAL POLICY BRIEFING
Radiofrequency Radiation in Communities and Schools

Actions by Governments, Health Authorities and Schools Worldwide
Please go to source documents by clicking on the blue underlined hyperlink. (Last updated 11/28/2016)

France

2016 The National Agency of Health Security of Food, Environment and Labour Report recommends

- regulatory changes to ensure "sufficiently large safety margins" to protect the health of young children.
- "ALL wireless devices, including tablets, cordless phones, remote controlled toys, wireless toys, baby monitors and surveillance bracelets, should be subjected to the same regulatory obligations as cell phones."

National Legislation *"Law on sobriety, transparency, information and consultation for exposure to electromagnetic waves"* passed in 2015.

- **WiFi Banned in Nursery Schools:** WIFI and Wireless devices will be banned in "the spaces dedicated to home, to rest and activities of children under 3 years".
- **WiFi on "OFF" as Default to Minimize Exposures in Schools**: In elementary schools,WIFI routers should be turned off when not in use.
- **Schools Will be Informed:** The school board should be informed when new tech equipment is being installed.
- **Cell Tower Emission Compliance Will Be Verified:** A decree will define the limits of emission of equipments for electronic communications or transmission to which the public is exposed. These values can be verified by accredited organizations and results will be made accessible to the public through a National Radiofrequency Agency.
- **Citizens Will Have Access to Environmental/Cell Tower Radiation Measurements** Near homes: Every resident may get access to the results of measurements for their living space.
- **Cell Antennae Maps For the Country**: A description and map of the places with

atypical (higher than the limits) places will be conducted at regular intervals with follow up of the actions being taken to limit the exposure. A map of all antennas will be produced for each town.

- **Continued Evaluation of Health Effects:** The National Radiofrequence Agency will be in charge of surveillance and vigilance, evaluating potential risks and setting up scientific research, including information on health effects.
- **SAR Radiation Labeling Mandated:** The SAR of cell phones must be clearly indicated on the package.
- Information on Reducing Exposures Mandatory: Information on ways to reduce exposure will be detailed in the contents of the cell phone package. .
- **WIFI Hotspots will be Labeled:** Places where WIFI is provided should be clearly marked with a pictogram.
- Advertisements Must Recommend Devices That Reduce Radiation Exposure to the Brain: Advertising for cell phones should clearly indicate the recommendation of hand free kits for protection of the head of the user and it will be included in the package. Advertising for cell phone not accompanied by such a kit is forbidden. Companies in violation will be fined 75,000 Euros.
- **Children Must Be Provided Protections:** At the request of the buyer, equipment reducing cell phone radiation exposures to the head for children less than 14 years should be provided.
- **The Public Will Be Informed:** Within a year, a policy of information on awareness and information on a responsible and reasonable use of cell phones and other apparatus emitting radiofrequencies will be set up.
- **Electrohyper-sensitivity Report To Be Submitted:** Within a year, a report on electrohyper-sensitivity must be given to the Parliament.

France: As of January 2017, new regulations aimed to protect employees from electromagnetic fields emitted by the electronic devices present in the workplace. A decree was issued by the French Government on 6 August 2016:

- Specific precautions will be taken regarding pregnant women.
- It is forbidden to place workers under age 18 in posts where EMF is apt to exceed limit values
- each employer has to evaluate EMF risks.
- When exposure exceeding limit values is detected or when an undesirable or unexpected health effect from exposure to EMF is reported, the worker will benefit from a medical visit.
- The employer must provide information and training to his employees regarding the characteristics of EMF emissions, the direct and indirect biophysical effects that could result from exposure to EMF, etc.
- The employer must adapt as much as possible the post in order to limit exposure to EMF.
- Read about it here.

2011 French Cell Phone Statute:

- Merchants must display SAR Radiation levels for different phone models, all phones must be sold with a headset, cell phone ads aimed at children younger than 14 are banned and phones made for children under 6 are banned.

2013 French Agency for Food, Environmental and Occupational Health & Safety Report

- Recommends hands free phones, SAR labeling, and "limiting the population's exposure to radiofrequencies… especially for children and intensive users, and controlling the overall exposure that results from relay antennas."
- The French National Library along with other libraries in Paris, and a number of universities have removed all Wi-Fi networks.
- Herouville-Saint-Clair has removed all Wi-Fi equipment installed in municipalities.

The City of Lyon France ran a Campaign "No Cell Phone Before 12 Years old" See colorful poster here.

Belgium

Federal Public Health Regulations passed on March 2013 due to Health Concerns for Children.

- Phones designed for children under 7 years old are prohibited from sale.
- Total **Advertising Ban on cell phones aimed at children.**
- Mandatory Radiation SAR levels must be available for consumers at point of sale.
- Warning label on phones: "**Think about your health – use your mobile phone moderately, make your calls wearing an earpiece and choose a set with a lower SAR value."**
- Recommendations include use of hands-free methods to keep the phone away from the body such as text messaging and not making calls when the signal is weak, such as in elevator/vehicle.
- See examples of the posters that shops must display.
- Read Belgium's frequently asked questions about the new law.
- Powerpoint Presentation IMPLEMENTATION OF the Council Recommendations in Belgium Introduction of new rules for mobile phone sales Presentation by Dr.Marina Lukovnikova (Ministry of Public Health, Belgium)
- Read the Belgium Health Food and Safety Brochure on Wireless devices here.
- Read Dr. Moskowitz Press Release on the Belgium Law.
- Read the News article Flanders Today: Belgium bans sale of mobile phones designed for children
- The Belgian Foundation Against Cancer warns that intensive use of a mobile phone can increase the risk of contracting cancer. They suggest that children younger than 12 should not use a mobile phone, and that using a mobile phone as an alarm clock is not desirable because the phone is in close proximity to the head the entire night. The Cancer Foundation also strongly advises people not to use a mobile phone in the car or a train. Read it here.
- Read the World Health Organization Belgium Report detailing the Law here.

Belgium Health Agency Recommendations to Reduce Exposure

- Read Belgium's Statement on Wireless Networks: **"**to reduce your exposure" which includes specific tips for Wi-Fi installations and I quote, " In order to limit the exposure, the following simple measures can be taken: Only switch on your wireless

network connection when it is needed. This concerns the wifi adapter in your laptop in particular. Otherwise, your laptop tries to continually connect to the network, and that leads to unnecessary exposure and decreases the life expectancy of the batteries. Place the access point away from places where you spend lots of time."

- Read Belgium's Tips for Reducing Cell Phone Exposure HERE; "Experts – including those on the Superior Health Council (link is external) – advise everyone to limit their exposure to mobile phone radiation. The following simple tips will help you."
- Children and Cell Phones: "The use of the mobile phone by children is a special point of attention. Children may be more sensitive to radio waves. Children absorb twice as much radiation in the brain than adults do, and 10 times more in the bone marrow of the skull. In addition, due to the popularity of the mobile phone, the cumulative exposure of the current generation of children will be much higher by the time they reach their adulthood than that of the current adults.

Belgiums Ghent Municipality: Wireless internet is banned from spaces that cater to children between 0 and three: preschools and daycares to reduce exposure to microwave radiation. Read news article about the ban here.

Spain

- The Parliament of Navarra voted to urge removal of WIFI in schools and to apply the precautionary principle in relation to exposure limits to electromagnetic fields whose boundaries have become "obsolete".
- The Parliament voted to adopt a resolution which calls to implement the Parliamentary Assembly of the Council of Europe resolution 1815 of 2011, which recommends to "review the scientific basis for the standards of exposure to electromagnetic fields" and " set thresholds for levels of preventive long-term exposure in all indoor areas not exceeding 0.6 volts per meter ".
- **2016 The High Court of Madrid recognizes "Electrosensitivity" as grounds for disability:** A telecommunications engineer who worked at Ericsson had his sensitivity recognized. "This is the first we have achieved total disability due exclusively to this syndrome," says attorney Jaume Cortés, the Col·lectiu Ronda. Read the news article here.
- The Vitoria City Council unanimously approved a precautionary approach with wireless: Citizens will be informed of the location of wireless transmitters are in civic centers and municipal buildings. It is recommended that children's spaces such as playgrounds and family libraries, will be free of WiFi or have decreased wifi and wifi free zones will be established in playgrounds and building entrances.
- **The Basque Parliament** joined the resolution of the Parliamentary Assembly of Council of Europe in 2011, which warns of the "potential risk" of electromagnetic fields and their effects on the environment and urged the promotion of campaigns against "excessive use "mobile phones among children.In a statement, the parliamentary Aralar, Dani Maeztustated, "To protect children's health, recommends the implementation of information campaigns and portable devices that emit microwaves, and prioritizes the use of cable connections in schools."
- **City of Tarragona Municipal Government (Tarragona is a major city 100 kilometres south of Barcelona) approved the "Institutional Declaration of**

support for people with Central Sensitivity Syndromes"

1. Carry out (with a yearly update) a diagnosis and census of those affected by CSS in the City of Tarragona, showing what is the actual situation and the specific needs of these patients and their families.
2. An intervention protocol for the staff of the Area of Services to Citizens of the Tarragona City Government to look after those with CSS- including a list of economic subsidies for food, first necessity elements, reduced water bill, and home help specific to the needs of these patients.
3. Housing protocol for people with CSS, especially those who have MCS and/or EHS, those threatened by eviction or those who are forced to leave their home. This protocol has to include a series of safe social housing (green/white spaces: free of xenobiotics and electromagnetic waves).
4. Create green/white spaces in all municipal buildings (free of xenobiotics and electromagnetic waves).
5. Eliminate, as much as possible, the use of pesticides in the whole of the municipality. In the case when this is not possible, establish a communication protocol to contact those affected and the press regarding the places and dates of the interventions with preventive advice.
6. Training for social workers and educators about CSS, its social, health and economic reality. Elaboration of information and education to increase the knowledge about these illnesses amongst the general population and of the city workers in particular, with the objective of diminishing the stigma that is now present regarding these illnesses.
7. Protocol for adapting working conditions of the municipal workers who have CSS with specific measures of support when having a flare up. These would be the measures: work schedule flexibility, encourage work from home through internet (teleworking), reserved parking spaces and include in the collective agreement not deduct the salary of the first 20 days of sick leave.
8. Read the full article detailing the actions here.

Canada

- **Health Canada offers "Practical Advice"** on reducing exposure to wireless radiation:
  1. Limit the length of cell phone calls, 2. Replace cell phone calls with text, use "hands- free" devices and 3. Encourage children under the age of 18 to limit their cell phone usage. Read it here.

> *"Health Canada reminds cell phone users that they can take practical measures to reduce RF exposure. The department also encourages parents to reduce their children's RF exposure from cell phones since children are typically more sensitive to a variety of environmental agents. As well, there is currently a lack of scientific*

information regarding the potential health impacts of cell phones on children."

- Canadian Parliament Standing Committee on Health of the House of Commons issued a report "Radio Frequency Electromagnetic Radiation and the Health of Canadians" on June, 2015 after holding public hearings regarding Health Canada's Safety Code 6 recommended limits. They made 12 recommendations including an awareness campaign on reducing exposures, improved information collecting and policy measures regarding the marketing of radiation emitting devices to children under the age of 14, "in order to ensure they are aware of the health risks and how they can be avoided."
- **2015:** National Bill C-648 *was Introduced* into the House Of Commons, "An Act Respecting the Prevention of Potential Health Risks From Radiofrequency Electromagnetic Radiation" would require manufacturers of all wireless devices to place specific health warning labels clearly on packaging, or face daily penalties /fines and/or imprisonment. Although the Bill did *not pass,* it made headlines.Press Conference for Bill C-648 Video.
- Canadian Pediatric Association issued a Position Statement Healthy active living: Physical activity guidelines for children and adolescents which states:
- For healthy growth and development: screen time (eg, TV, computer, electronic games) is not recommended for children under 2 years old. For children 2-4 years, screen time should be limited to <1 h/day; less is better. Read the Position Statement Here.

European Parliament

Resolution 1815: **In 2011 The Parliamentary Assembly of the Council of Europe issued *The Potential Dangers of Electromagnetic Fields and Their Effect on the Environment.***

A call to European governments to "take all reasonable measures" to reduce exposure to electromagnetic fields "particularly the exposure to children and young people who seem to be most at risk from head tumours." The Resolution calls for member states to:

- Implement "information campaigns about the risk of biological effects on the environment and human health, especially targeting children and young people of reproductive age. "
- "Reconsider the scientific basis for the present standards on exposure to electromagnetic fields set by the International Commission on Non-Ionising Radiation Protection, which have serious limitations, and apply ALARA principles, covering both thermal effects and the athermic or biological effects of electromagnetic emissions or radiation."

"For children in general, and particularly in schools and classrooms, give preference to wired Internet connections, and strictly regulate the use of mobile phones by schoolchildren on school premises." Read Resolution 1815

Read the 2009 Resolution: Health concerns associated with electromagnetic fields calling for a review of the issue.

Australia

The Australian Radiation Protection and Nuclear Safety Agency has issued a Fact Sheet titled *How to Reduce exposure from mobile phones and other wireless devices.*

- Reduce the risk from WiFi devices by "keeping them at a distance, for example placing the wireless router away from where people spend time", and "reducing the amount of time you use them".
- ARPANSA recommends that parents encourage their children to limit their exposure stating that "It is recommended that, due to the lack of sufficient data relating to children and their long term use of mobile phones, parents encourage their children to limit their exposure by reducing call time, by making calls where reception is good, by using hands-free devices or speaker options, or by texting." Read it HERE.

Queensland Department of Education, Training and Employment issued Your Guide to Safe Technology guide in 2015 to all schools that states:

> *It's not only physical hazards you need to consider when thinking about health and safety issues at work or home — you should also think about how you use technology.*
>
> *When using a computer, you need to think about:*
> - *ergonomics and posture*
> - *radiation*
> - *vision impacts*
> - *harmful lack of exercise (DVT).*
>
> *"Wireless devices — smart/mobile phones, tablets, slates, monitors etc — all emit low levels of electromagnetic radiation and should be used correctly. When using electronic devices, the department recommends you follow WiFi/3G/4G best practice:*
> - *follow the manufacturer's usage guideline operate from a table or bench — not on your lap*
> - *use 'hands-free' devices to keep smart/mobile phones away from your head and body during phone calls limit the number and length of calls*
> - *position the device antenna away from your body*
> - *do not sit within 0.5 m of a wireless router use smart/mobile phone in areas of good reception to reduce exposure."*
> - Watch a video on these recommendations here.

New Zealand

Rotokawa School implemented steps to minimize RF Exposure on 2/2/2016
After concerns raised about e-learning by a small group of parents from the school, the principal has put some positive procedures in place as follows;

- Children will use ipads in flight mode
- Children using laptops and Chromebooks will work on the desk top
- Parents may request that their child use an Ethernet cord to access the internet
- Children are taught about the health precautions as part of their cyber citizenship
- Digital learning in the one to one Year 5 & 6 environment is kept to less than 2 hours per school day.

- The principal has also stated there are no plans to increase the existing Wi-Fi coverage at this stage.

Italy

- 2016: Mayor of Borgofranco d'Ivrea has ordered Wi-Fi to be turned off in **schools.** "Mayor Livio Tola told the town's high school and elementary school to return to using cables to connect to the internet after reading that the electromagnetic waves given off by wireless routers were especially harmful to young children." Read the newspaper article here. Read the News article here "Ivrea, The Mayor Removes WiFi as it Could Be Dangerous".
- **On June 10, 2015, the State Parliament of South Tyrol voted to** allow the application of the precautionary principle **mandating the state government to:**

  1. To replace existing wireless networks whenever possible with networks that emit less radiation at schools, preschools, hospitals, nursing homes, and other public facilities.
  2. Establish a working group whose mandate it is to assess these new technologies and their exposure levels. With regard to wireless communication technologies, mobile Internet access, and public health, the working group shall clarify which technologies emit less radiation and provide sustainable technology options and
  3. To start an education and awareness campaign that informs about possible health risks, especially regarding the unborn, infants, children, and adolescents and that develops guidelines for a safer use of cell phones, smartphones, and Wi-Fi Discussion at the Plenary Session, 10 June 2015 (in German) ///////Official Files, Resolutions (in German) ////////Previous Hearing at the Parliament of South Tyrol, 29 April 2015 (in German)

- **The** Italian Supreme Court **ruled a man's brain tumor was caused by his cell phone use in 2012.** The National Institute for Workmen's Compensation must compensate a worker with head tumor due to cell use. Read news article with details here. Read Daily Mail article Mobile phones CAN cause brain tumours, court rules in landmark case.
- **A school In Lecce, Italy, "Istituto Comprensivo Alighieri- Diaz" banned wifi.** Their two resolutions decided: a) to ban wifi in school and install a wired system for the use of internet and b) Reject the request of the local government (Municipality) to install an antenna on the school roof for the wireless signal providing for the "Wireless city" program. The resolution also asks the Municipality to install the antenna at a reasonable distance from school.Read the official resolutions number 1here and Resolution 2 Here.
- **The Piemonte Region has adopted a resolution to limit EMF exposure,** to limit the use of wifi in schools and be considerate to the problem of EHS people. Read about it here.
- **The Italian Society for Preventive and Social Pediatrics has officially called to prohibit cell phones for children under 10 years old.** Giuseppe Di Mauro,

president of the Italian Society of social and preventive pediatrics [Società italiana di pediatria preventiva e sociale (www.sipps.it)] "We do not know all the consequences associated with cell phone use, but excessive use could can lead to concentration and memory loss, increase in aggressiveness and sleep disturbances." and he cites electromagnetic fields stating"The damage to health are increasingly evident" Read it here.

- **Turin Mayor Chiara Appendino laid out plans "to cut back on Wi-Fi in state school**s and government buildings over concerns that radiation might damage people's health". Read 7/2016 News Report Turin could slash Wi-Fi over 'radiation' concerns

Finland

In 2015 the Radiation and Nuclear Safety Authority (STUK) revamped their public information website to recommend reduced exposure to children and state the following:

- The page Mobile phones are a major source of radio frequency radiation states that, 'The level of exposure to radiation from a mobile phone held next to user's ear can approach the exposure limits. *Never before have humans been exposed to equally strong sources of radiation in their living environments.* Identifying any health impacts is highly important because practically everybody uses a mobile phone today."
- Read STUK Recommendations to *reduce cell phone exposure* HERE: Use a hands free device, don't use phones reception is poor, the phone should be kept on a table or similar location instead of in the user's pocket.
- "STUK recommends that unnecessary exposure to radiation from mobile phones be avoided. In particular, children's unnecessary exposure should be avoided as their life- long exposure will be longer than that of those who begin using mobile phone as adults and as only scant research exists on health effects to children."

In 2009 the Radiation and Nuclear Safety Authority (STUK) initially issued recommendations to reduce exposure with more explicit cautionary language.

- Read the information posted on the STUK website in 2009- now removed.
- Read a policy position paper by STUK from 2009 detailing why "It would be good to restrict children's use of mobile phones."
- Read the 2011 policy position from STUK.
- Read a news article from 2009 when STUK first recommended restricting the use of mobile phones by children.

Israel

- The Israeli Government created the EMF public education webpage National Information Ctr for Non-Ionizing Radiation . The Israeli Ministry Of Education has issued guidelines limiting WiFi and cell phone use in schools.
- Preschool through 2nd grade have banned the use of wireless networks. In third and fourth grade class internet is restricted to 3 hours per week.
- A hard wired direct cable connection is required if the teacher has a computer in the class.

- Magnetic fields below 4 mG are being reduced in schools representing the government's position that international guidelines are NOT protective of children.
- The Israeli Supreme Court ordered the Israeli government to reply on ceasing Wifi installations
- In third and fourth grade class internet is restricted to 3 hours per week.
- The Education Ministry has instructed all schools to perform radiation tests.
- Israel's Minister of Health Rabi Litzman stated that he supports a ban on Wi-Fi in schools.
- A hard wired direct cable connection is required if the teacher has a computer in the class.

2016: Cell phones are banned in classrooms per a memorandum from the Ministry of Education. Watch a newsreport on this action here.

Read the official ISRAEL 2015 RF Safety Report with actions being taken to reduce EMF.

The Ministry of Health published Environmental Health in Israel 2014 which states that "Precautions should be strictly enforced with regard to children, who are more sensitive to developing cancer." and that "wireless communication networks in schools be reduced." The Health Ministry recommends "sensible use of cellular and wireless technology, including: considering alternatives like landline telephones, use of a speaker while talking on a cellphone, and refraining from installing the base of wireless phones in a bedroom, work room, or children's room." The Report states that "Findings in Israel clearly indicated a link between cellphone use for more than 10 years and the development of tumors in the salivary glands, particularly among people who held the telephone on the same side where the tumor developed and individuals in the highest category of exposure (heavy use in rural areas)."

- Linda S. Birnbaum, Director, USA National Institute of Environmental Health Sciences and National Toxicology Program wrote in the Israeli Report final chapter that, " If some of the om studies turn out to be harbingers of things to come, we may have major health consequences from the nearly ubiquitous presence of wireless equipment."

Haifa (Israel's third largest city) removes Wi-fi from all schools.

- Haifa Major Yona Yahav, said that "When there is a doubt, when it comes to our children, there is no doubt". Read the News Report The - Wi-Fi in kindergartens and schools in Haifa severed.
- "The roots of the decision go back to a 2013 petition by parents in four schools who claim that such networks are harmful. The case eventually made its way to the High Court, which has postponed a final decision on the matter...The movement has spread from Haifa to other cities as well, and petitions have been signed by parents in dozens of cities demanding the removal of the networks. Haifa is the first city to take action on the matter.Haifa Mayor Yona Yahav said that the city would replace the wireless network with a wired connection that will provide safer options to students." Read the news article here.
    - This action occurred after this Israeli TV Documentary – "HOW WE ARE KILLING OURSELVES – WIRELESS RADIATION" aired.

Read the 2009 News article on the cell phone guidelines in Israel Health Ministry.: Limit Kids' Use of Cell Phones

Switzerland

- **The Switzerland Federal Office for the Environment** FOEN has a webpage on Wi-Fi which states "caution should be exercised primarily when using devices held close to the body, such as laptops, PDAs and Internet telephones.." and gives recommendations on how to reduce exposure including turning the Wi-Fi off when not in use, installing the access point one metre away from places where you work, sit or rest for long periods of time and keeping laptops off laps.
- **The Switzerland Federal Office for the Environment** FOEN has a webpage on Cell Phones which details ways to reduce mobile phone radiation. FOEN also has additional EMF factsheets on various EMF sources including on baby monitors where they state that "it is **advisable to reduce the infant's exposure to emissions as far as possible."**
- **The 2015 Environmental Report Chapter 17 on Electrosmog** states "Effects can also be detected for weak radiation intensity. For example, weak high-frequency radiation can alter electric brain activity and influence brain metabolism and blood flow. Whether these effects have an impact on health is still unclear" and recommends the precautionary principle to reduce risk "Because major gaps still exist in our knowledge about the health impacts of long- term exposure to weak non-ionising radiation, the adopted protective strategy should be pursued consistently." Read it here.
- Switzerland FOEN 2012 Radiation of radio transmitters and Health "*In view of the fact that there are gaps in the available data, the absence of proof of health risks does not automatically also mean proof of their absence. From the scientific point of view, a cautious approach in dealing with non-ionising radiation is still called for. There remains a need for extensive research into the potential long-term effects"*
- The Governing Council of Thurgau Canton 2008 "The Governing Council recommends for schools to forgo the use of wireless networks when the structural makeup of a given school building allows for a wired network." Read a letter by the Council here.

Swiss Physicians Association of Doctors for Environmental Protection

2012 Swiss Physicians Letter "the risk of cancer for this type of [wireless] radiation is similar to that of the insecticide DDT, rightfully banned... From the medical point of view, it is urgent to apply the precautionary principle for mobile telephony, WiFi, power lines, etc."

2014: Preliminary draft for a federal law on the protection against dangers: Non-ionizing radiation (NIS) is growing steadily. Especially the everyday stress in the area of low-frequency and high-frequency. Read it here.

2016: Press Release on the NTP Study and Policy Implications: "There are increasingly clear indications that mobile radio is a health hazard. From a medical point of view it is clear: the scientific results so far show it is clear that prudent avoidance of unnecessary exposures is necessary."

- Additional Links by Swiss Physicians for the Environment
- Report on Smartphones- (OEKOSKOP 1/16) AefU-News about Electrosmog

Germany

The Federal Office for Radiation Protection (FORP) provides tips for reducing radiation exposure to smartphones, tablets and wireless devices stating, "*Since long term effects could not be sufficiently examined up to now the Federal Office for Radiation Protection (BfS) recommends to keep exposures to these fields as low as reasonably achievable.*" **Read the precautionary advice here.**

"There are uncertainties in the risk assessment that the German mobile communications research programme has not been able to remove completely. These include in particular:

- possible health risks of the long-term exposure of adults to *high frequency electromagnetic fields when making mobile telephone calls (intensive mobile use over more than 10 years)*
- *the question of whether the use of mobile phones by children could have an effect on health.*

For these reasons, the BfS continues to consider that precautionary measures are necessary: exposure to electromagnetic fields should be as low as possible."

- Smartphones and Tablets: Read the webpage with recommendations to reduce exposure here:

"Smartphones and tablets for children?

It is particularly important to minimise children's exposure to radiation. They are still developing and could therefore react more sensitively in terms of health."

- The FORP recommends landline phone instead of mobile phone base stations and that schools should not connect wirelessly to the internet. **Read a 2015 statement here.**

See their poster "Less radiation when Telephoning" here.

The German Federal Ministry for Radiation Protection stated in 2007 ,"supplementary precautionary measures such as wired cable alternatives are to be preferred to the WLAN system." See original German Bundestag document here, and an English translation here.

Bavaria: The State Ministry of Education and Cultural Affairs: "For precautionary reasons the Federal Office for Radiation Protection recommends for schools that if a wireless network is used to place its components in suitable locations and to prefer the use of wired network solutions whenever possible." In 2007 Parliament recommendation to all schools to *not* install wireless LAN networks.

Frankfurt: "In Frankfurt's schools there will be no wireless networks in the short or mid term. The Local Education Authority did not wish to conduct a "large scale human experiment," said Michael Damian, spokesperson of the Head of the School Department Jutta Ebeling.

2013: Four German Federal Agencies issued a guidebook recommending reducing cell phones and Wi- Fi to young children: "Parenting Guide: Environmental and Child Health" by the Federal Office for Radiation Protection (BfS), the Federal Institute for Risk Assessment (BfR), the Robert Koch Institute (RKI) and the Federal Environmental Agency (UBA). It contains practical information including reducing electromagnetic radiation from baby monitors and

telephones: Baby monitors should be as far as possible away from the crib. Phones should be banished from the nursery. They are not suitable toys for infants and toddlers. Use of cabled landline phones is preferable. Wi-Fi routers are are not suitable in children's bedrooms, and should be switched off when not in use, especially at night.

- Download Parenting Guide: Environmental and Child Health here.
- Read a news article about it by clicking here.

Austria

Salzberg: The Public Health Department Advises Against Wi-Fi in Schools: "The official advice of the Public Health Department of the Salzburg Region is not to use WLAN and DECT in Schools or Kindergartens." -Gerd Oberfeld, MD.

The public health department of Salzburg (Landessanitätsdirektion) recommends to evaluate mobile phone base station exposures based on the EUROPAEM EMF Guideline 2016

The Public Health Department of Salzburg lists Electrosmog studies highlighting the EUROPAEM EMF guideline 2016 as representing the current state of medical science that it is used by the Landessanitätsdirektion Salzburg for the health assessment of EMF.

The Vienna Medical Association has issued cell phone safety guidelines stating that cell phones should be used for as short of a time as possible and that children under 16 should not use cell phones at all. They also state that "wireless LAN leads to high microwave exposure".

January 2016 : Vienna Medical Association has issued new Ten Cell Phone Guidelines. They are:

1. Make calls as short and little as possible - use a landline or write SMS. Children and teenagers under 16 years old should carry cell phones *only for emergencies!*
2. Distance is your friend- Keep the phone away from body during connection of Phone. Pay attention to the manufacturer's safer distance recommendation in the manual, keep a distance during the call set-up from the head and body. Take advantage of the built-in speakerphone or a headset!
3. When using headsets or integrated hands-free, do not position mobile phones directly on the body - special caution applies here for pregnant women. For men, mobile phones are a risk to fertility if Mobile is stowed in Trouser pockets. Persons with electronic implants (pacemakers, insulin pumps et cetera) must pay attention to distance. Unless otherwise possible, use coat pocket, backpack or purse.
4. Not in vehicles (car, bus, train) calls - without an external antenna, the radiation in the vehicle is higher. In addition, you will be distracted and you bother in public transport the other passengers!

5. During the car when driving should be an absolute ban on SMS and internetworking - the distraction leads to self-endangerment and endangering other road users!
6. Make calls at home and at work via the fixed corded (not wireless) network - Internet access via LAN cable (eg via ADSL, VDSL, fiber optic) no Radiation, is fast and secure data transfer. Constant radiation emitters like DECT cordless telephones, WLAN access points, data sticks and LTE Home base stations (Box, Cube etc.) should be avoided!
7. Go offline more often or use Airplane mode - Remember that for functions such as listening to music, camera, alarm clock, calculator or offline games an internet connection is not always required!
8. Fewer apps means less radiation - Minimize the number of apps and disable the most unnecessary background services on your smartphone. Disabling "Mobile services" / "data network mode" turns the smartphone again into a cell phone. You can still be reached, but avoid a lot of unnecessary radiation by background traffic!
9. Avoid Mobile phone calls in places with poor reception (basement, elevator etc) as it increases transmission power. Use in poor reception Area a headset or the speakerphone!
10. For buyers of mobile phones, Look out for a very low SAR value and an external antenna connection!

Read the Press release (in German): http://www2.aekwien.at/1964. py?Page=1&id_news=8972

See The Poster (in German): http://www.aekwien.at/aekmedia/Medizinische-Handy-Regeln.pdf

See the translated Poster with Tips in English

Austria's" Highest Health Council of the Ministry of Health" has a brochure with advice to reduce exposure to cell phone radiation. It states that since the long term research is still not completed, it is advisable to take simple precautions to reduce exposure. Read the Brochure here. See the WHO Report on Austria's EMF activities and research studies underway here.

India

2012 The Ministry of Communications and Information Technology issued new EMF guidelines with new Exposure Limits *lowered to 1/10 of the ICNIRP level, and* SAR labeling on phones.

- Official cell phone radiation guidelines *Precautionary Guidelines for mobile users*: 1. Keep distance – Hold the cell phone away from body to the extent possible. 2. Use a headset (wired or Bluetooth) to keep the handset away from your head. 3. Do not press the phone handset against your head. Radio Frequency (RF) energy is inversely proportional to the square of the distance from the source -- being very close increases energy absorption much more. 4. Limit the length of mobile calls. 5. Use text as compared to voice wherever possible. 6. Put the cell phone on speaker mode. 7. If the radio signal is weak, a mobile phone will increase its transmission power. Find a strong signal and avoid movement – Use

your phone where reception is good. 8. Metal & water are good conductors of radio waves so avoid using a mobile phone while wearing metal-framed glasses or having wet hair. 9. Let the call connect before putting the handset on your ear or start speaking and listening – A mobile phone first makes the communication at higher power and then reduces power to an adequate level. More power is radiated during call connecting time. 10. If you have a choice, use a landline (wired) phone, not a mobile phone. 11. When your phone is ON, don't carry it in chest/breast or pants pocket. When a mobile phone is ON, it automatically transmits at high power every one or two minutes to check (poll) the network. 12. Reduce mobile phone use by children as a younger person will likely have a longer lifetime exposure to radiation from cell phones. 13. People having active medical implants should preferably keep the cell phone at least 15 cm away from the implant.

- The Parliamentary Standing Committee on Science & Technology, Environment & Forests issued a report in the Rajya Sabha on July 23, 2015, recommending "indigenous methodology and techniques to check the alarming increase in radiation from radio-active signals, RF and Electro- magnetic Fields (EMFs)." The committee said "Indians were more prone to risk from radiations as compared to Europeans because of their low body mass index (BMI) and low fat content. Therefore, comprehensive scientific studies must be conducted to "conclusively establish the level of risks and adverse health effects of electromagnetic radiation (EMR) of cell towers".
- 2013: Supreme Court of India upheld the High Court of the State of Rajasthan decision to remove all cell towers from the vicinity of schools, hospitals and playgrounds because of radiation "hazardous to life." Two hundred and four mobile towers installed on the school premises of Rajasthan have been removed in compliance.
- A Journey for EMF: The Ministry of Communications and Information Technology has developed an EMF webpage.
- Zilla Parishad orders removal of all cellphone towers near schools citing exposure to "harmful radiation".
- **Municipal Corporation of Greater Mumbai**, the civic body that governs the capital city of Mumbai in Maharashtra (India's richest municipal organization) in 2016 in its new policy on mobile towers, no longer allows cell towers on playgrounds, recreational grounds, gardens and parks. Read news article.
- Read a Document prepared by Dr. Sharma, Sr. Deputy Director of the Indian Council of Medical Research on Indian Research Studies.
- See the Colorful graphic created by the Government Ensuring Safety from Radiations: Mobile Towers and Handsets
- Read the 2011 Report: Ministry of Environment and Forest, Government of India's Expert Group study on the possible impacts of communication towers on Wildlife including Birds and Bees
    - *"The review of existing literature shows that the Electro Magnetic Radiations (EMRs) are interfering with the biological systems in more ways than one. There had already been some warning bells sounded in the case of bees and birds, which probably heralds the seriousness of this issue and indicates the vulnerability of other species as well."*

Russia

- The Russian National Committee on Non-Ionizing Radiation Protection in *ELECTROMAGNETIC FIELDS FROM MOBILE PHONES: HEALTH EFFECT ON CHILDREN AND TEENAGERS (2011)* has repeatedly warned about electromagnetic radiation impacts on children and recommended WiFi not be used in schools.
- **Official Recommendations:** The Russian Federation specifically advises that those under the age of 18 should not use a mobile phone at all, recommends low- emission phones; and requires the following: on-device labelling notifying users that it is a source of RF-EMF, user guide information advising that ''it is a source of harmful RF-EMF exposure'' and the inclusion of courses in schools regarding mobile phones use and RF-EMF exposure issues. "Thus, for the first time in the human history, children using mobile telecommunications along with the adult population are included into the health risk group due to the RF EMF exposure."
  - "In children, the amount of so-called stem cells is larger than in adults and the stem cells were shown to be the most sensitive to RF EMF exposure."
  - "It is reasonable to set limits on mobile telecommunications use by children and adolescents, including ban on all types of advertisement of mobile telecommunications for children."

Decision of Russian National Committee on Non-Ionizing Radiation Protection 2008, "Children and Mobile Phones: The Health of the Following Generations is in Danger"

European Environment Agency

- The EEA's issued 2013 *Late Lessons From Early Warnings: Chapter 12: Mobile phone use and brain tumour risk: early warnings, early actions?* which concludes that " Precautionary actions now to reduce head exposures, as pointed out by the EEA in 2007, and many others since, would limit the size and seriousness of any brain tumour risk that may exist. Reducing exposures may also help to reduce the other possible harms..." Read it here.
- 2011 David Gee, EEA Senior Advisor on Science, Policy and Emerging Issues stated in a press release that "We recommend using the precautionary principle to guide policy decisions in cases like this. This means that although our understanding is incomplete, this should not prevent policy makers from taking preventative action.**"** Read it here.
- 2009 EEA Recommendations based on current evidence (2009) The evidence is now strong enough, using the precautionary principle, to justify the following steps: 1. For governments, the mobile phone industry, and the public to take all reasonable measures to reduce exposures to EMF, especially to radio frequencies from mobile phones, and particularly the exposures to children and young adults who seem to be most at risk from head tumours.
- 2007 Professor Jacqueline McGlade, the EEA's executive director issued a statement that "Recent research and reviews on the long-term effects of radiations from mobile telecommunications suggest that it would be prudent for health authorities to recommend actions to reduce exposures, especially to vulnerable groups, such as children." Read it here.

Singapore

Singapore's National Environmental Agency specifically advises precautions. Below is the exact text found on the Frequently asked Questions About **Radiation Protection.**

"What is NEA's advice to the public on the proper way of using mobile phones amidst all the concerns?
While further research is being carried out to study the long-term health effects of RF field, individuals could take precautionary measures to reduce RF exposure to themselves or their children by limiting the length of calls, or using 'hands-free' devices to keep the mobile phones away from the head and body."

United Kingdom

The UK National Health Service has changed it's advice. Here is the story. As of 2011 it offered specific Recommendations to reduce cell phone radiation exposure to children.

- Read the pre 2015 webpage entitled 'Risks of mobile phone use' with recommendations which state; "Children are thought to be at higher risk of health implications from the use of mobile phones. This is because their skulls and cells are still growing and tend to absorb radiation more easily. It is recommended that children use mobile phones only if absolutely necessary."
- Read the UK Department of Health pre- 2015 brochure on mobile phones and health which reads:

"The expert group has therefore recommended that in line with a precautionary approach, the widespread use of mobile phones by children (under the age of 16) should be discouraged for non-essential calls. In the light of this recommendation the UK Chief Medical Officers strongly advise that where children and young people do use mobile phones, they should be encouraged to: • use mobile phones for essential purposes only • keep all calls short - talking for long periods prolongs exposure and should be discouraged The UK CMOs recommend that if parents want to avoid their children being subject to any possible risk that might be identified in the future, the way to do so is to exercise their choice not to let their children use mobile phones."

- Read the 2011 brochure on base stations and health which reads, "Therefore, as a precaution, the UK Chief Medical Officers advise that children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short. If you are concerned, you can take steps to reduce your exposure such as using hands free kits or texting."
- The NHS also had additional website sections on health effects. The Mobiles and mums-to-be webpage was about the research showing cell phone was linked to behavioral issues in children. Read it here. The NHS webpage Mobile effect on sleep detailed research which concluded RF " is associated with adverse effects on sleep quality within certain sleep stages". These webpages were deleted from the current site.
- For the public they had "recommendations to help lower any potential long-term risks"

which include keeping calls short, keep phone away from the body on standby mode, only use it when the reception is strong and use a phone with an external antenna.

- 2002 The Stewart Report commissioned by the UK Government found that exposure to RF radiation below guidelines has not been "proven" to cause adverse health effects but it is not possible to say "that exposure to RF radiation, even at levels below national guidelines, is totally without potential adverse health effects" as "there is some scientific evidence which suggests that there may be biological effects and gaps in knowledge justify a precautionary approach to the use of mobile phone technologies until much more detailed and scientifically robust information on any health effects becomes available."
- Check out a slide presentation on people and wireless radiation by NHS here.

Then, the UK National Health service changed the public advice text. Everything noted *above* was reworded. *Now* the website states:

- "If there are any health risks from the use of mobile phones, children might be more vulnerable because their bodies and nervous systems are still developing. Research carried out to date hasn't supported a link between mobile phone use and childhood cancers such as leukaemia. However, if you have any concerns, you can lower your child's exposure to radio waves by only allowing them to use mobile phones for essential purposes and keeping calls short." Read this *new* text here.
- See the brochure (2011) entitled "Mobile phones and base stations: Health advice on using mobile phones" which states: The body and nervous system are still developing into the teenage years. Therefore, as a precaution, the UK Chief Medical Officers advise that children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short.
- The newly edited section called Mobile phone safety - FAQs states:

Do scientists know everything about mobile phones and health?

No, and research is continuing. Mobile phones have only been widely used for about 20 to 30 years, so it's not possible to be so certain about the safety of long-term use. More research on the effects of mobile phones on children is also needed, as they're known to be more sensitive than adults to many environmental agents, such as lead pollution and sunlight. Government advice is to be on the safe side and limit mobile phone use by children.

2016 The Control of Electromagnetic Fields at Work Regulations 2016 (CEFAW) requires employers to assess the levels of EMFs their employees may be exposed to, ensure compliance, provide information on risks and take action if necessary. Legislation http://www.legislation.gov.uk/uksi/2016/588/pdfs/uksi_20160588_en.pdf

- "You must ensure you take workers at particular risk, such as expectant mothers and workers with active or passive implanted or body worn medical devices, into account when appropriate, devise and implement an action plan to ensure compliance with the exposure limits." Read news article on regulations.

Cyprus

"Be Precautionary and reduce exposure to phones, Wi-Fi and other wireless devices," states the Cyprus National Committee on Environment and Child Health (ECH). Dr. Stella Michaelidou, President of the ECH, states that society should respond by taking precautions because "Documentation of other potential and more serious biological side effects are on the tip of an emerging iceberg." This stance was documented in a recent news article that quotes Michaelidou stating that "multiple and frequent exposure to this kind of radiation, which falls below the acceptable levels of thermal effects, pose a health risk to a developing embryo." and children who use their mobile phone more frequently face a higher risk at having a weaker memory, attention deficit disorder, and similar issues.

The Cyprus National Committee on Environment and Child Health supported by Cyprus "has as its basic aim the prevention of illnesses, which also are related with the exposure of children in environmental dangers." The activities of the National Committee are supported by the State of Cyprus. Read about the Committee and it's mission on their website here (click on the British flag to get the English translation.)

Official Statements and Documents

- Protecting children from radiation emitted by Wi-Fi, mobile phones and wireless by Dr. Stella Kanna Michailidou of the National Committee Chairman "Environment and Children's Health"
- See the Commission's EMF brochure on reducing the risks to children from exposure to the Non Ionizing Radiation (mobile phones, Wi-Fi, tablets, etc.).
- The National Committee on Environment and Children's Health Website Information on EMFs can be acessed at http://www.cyprus-child-environment.org/easyconsole.cfm/id/324

PSA Video Children's Health and Wi-Fi

- The Cyprus National Committee on Environment and Child Health created a short PSA for citizens about children and wireless radiation and how to reduce Wi-Fi exposure.
- Watch the greek version here https://www.youtube.com/watch? v=996vzcCYCnE
- Watch the video translated into english here https://www.youtube.com/watch? v=996vzcCYCnE

Scientific presentations:

- See the 12/2015 Powerpoint Slide Presentation by the President of the Commission, Dr. Stella Kanna Michaelides on EMFs (in Greek) by clicking here and Dr Michalis Tornaritis on media use (in Greek) by clicking here.
- IOANNINA UNIVERSITY COURSES IN PATHOLOGY Neurological and behavior effects of Non Ionizing Radiation emitted from mobile devices on children: Steps to be taken ASAP for the protection of children and future generation by Dr. Michaelidou of the Cyprus National Committee on Environment and Health. English slides at this link.

News Reports

- Watch the President of the Cyprus National Committee " Environment and Health of the Child" presents the issue of Electromagnetic radiation and its effects on children's health.

April 2016

- https://www.youtube.com/watch?v=UCub5UEBLVI
- Sigma TV News Report on children and Wi-fi https://www.youtube.com/watch?v=WumF2qOUKrU
- Watch the president of the National Committee "Environment and Child Health" with Professor Loukas Margaritis speaking in a news piece. https://www.youtube.com/watch?v=WumF2qOUKrU
- 2015 In-Cyprus News Report: **Mobile devices could harm kids**
- 9/2015 News Report Cyprus Mail: 'Technology harming our children' MPs say

Argentina

2016 National law on electromagnetic pollution *proposed*: The law proposes a regulatory framework to "radio infrastructure with radiant systems, antennas and all installations capable of generating electromagnetic radiation" in order to "ensure the protection of public health" considering "both thermal effects and biological. " In education and health facilities only wired connections to data networks and Internet access may be used. Translated Article. Original text:

Taiwan

In 2015 the government *Updated their* Protection of Children and Youths Welfare and Rights Act to ban cell phones for young children. Read it here.

- Complete ban on children under the age of two from using electronic devices such as iPads, televisions and smartphones.
- Parents can be fined NT$50,000 (about $1600 US Dollars)
- The new law also states that parents must ensure that under-18s only use electronic products for a 'reasonable' length of time.
- Read a news article: Daily Mail- Taiwan makes it ILLEGAL for parents to let children under two use electronic gadgets... and under-18s must limit use to 'reasonable' lengths"

Namibia

Namibia's atomic energy review report states that current so called "safety" standards DO NOT protect citizens from long term health effects.

- "ICNIRP guidelines do not guarantee adequate protection against the long term effects of exposure, such as increased risk of cancer. " -Republic of Namibia:Atomic Energy Board: The Atomic Energy Review

Turkey

The Ministry of Health has issued public information brochures that recommend limiting exposure especially for pregnant women and children. In addition the Ministry is developing regulation on prohibiting phone use for children. The EMF in schools is monitored and the public can get measurements on EMF levels from cell towers and schools at a national site.

- See the Ministry of Health Brochure Mobile Phones and Health Effects: The Brochure starts by saying the research on cell phone radiation shows low levels of electromagnetic frequencies "may cause cancer". 13 Recommendations to Reduce Exposure *which include:* Pregnant women and children (under 16) are more vulnerable and they should use the phone only when necessary, Prefer speaker or headset, Decrease time on phones, Use low SAR phone, Keep phone away from the body, Keep phones out of baby and children's bedroom,Turn phone off when you sleep or keep it one meter away from bedside, using phones in cars increases your EMF exposure so it is not recommended.
- **Education on Safer Phone Use:** A Project funded by Ministry of Internal Affairs, accomplished by Temkoder (Prevention, Measurement of Electromagnetic Pollution and Training Organization) resulted in secondary school student training in the safer usage of cellular phones.
- **Development of regulations prohibiting children's cell phone use.** In 2014, the Ministry of Health started working on new regulations to prohibit cellphone usage for children under 14 year-old children.(See Turkey's 2014 World Health Organization EMF Report here). However by 2016 the regulation was weakened and in the 2016 WHO EMF Report Turkey states that they are developing regulations that only would pertain to children under 7 years old.
- The Ministry of Communications and Maritime Affairs monitors Electromagnetic fields around the schools and homes. See the website here http://ema-olcum.btk.gov.tr/.

Greece

Greek law mandates lower RF exposures near schools, nurseries and hospitals: The exposure limits in Greece are the 70% of the official European limits. In areas less than 300 m from schools, hospitals and nurseries the exposure limit is lower at 60% of the official European limits. Cell antennae are prohibited from being on top of schools and nurseries.

2012: The Greek government website materials recommend reducing cell phone radiation to children under 16 and they inform citizens of non-ionizing radiation power levels in their community.

- The National Observatory of Electromagnetic Fields which is an interactive web portal linked to a network of 500 fixed measurement stations throughout Greece that continuously monitor the EMF levels from all kinds of antenna stations in the frequency range 100 kHz – 7 GHz.
- ELF and EMF Site Measurements can be looked up for various locations at EEAE.
- The Greek government funds research as detailed on the WHO EMF report here.
- The Q and A on RF radiation states the following text about children. Read it here on page 32 and 33

"Even though it hasn't been proven conclusively that children are more sensitive/reactive than adults to exposure to radiation, nevertheless, the direct/pointed recommendation of international organizations is

that children be discouraged from [literally translated, learn not to trust] using cell phones.

The above statement is supported by the following:

1. *Up to about the age of 16, the nervous system of the human body is in the process of development. Consequently, it's totally possible (although not conclusively proven by relevant scientific research) that up until this age, human being are more sensitive to any number of factors/elements/determinants.*
2. *Younger people have more years ahead of them than older persons during which the long –term effects of mobile phones can be manifested.*
3. *Environmental factors/elements have a greater general impact on the health of children than on the health of adults."*

Chile

2012, Law No 20.599, The Antennae Law 'Regulates the installation of antennas used for the emission and transmission of telecommunications services' This law limits the power of antennas, reduces urban impact of towers through 'infrastructure sharing' opens up a process for citizen participation in the approval or denial process, establishes mitigation measures in areas that are saturated with antennas and prohibits towers near "sensitive areas" institutions serving children, the elderly and medically compromised.

Cell antennae/towers are prohibited in "sensitive areas"

- Sensitive areas are those areas that demand special protection due to the presence of educational institutions, nurseries, kindergartens, hospitals, clinics, nursing homes or other institutions of similar nature. .
- Read New communications antenna law in Chile in the International Bar Association Legal Practice Division Newsletter for details on the Law. Read a Press release with summary.
- Read RCRWireless article Chilean telecom companies need to comply with new antenna law
- Chile's Minister of Transportation and Telecommunications Pedro Pablo Errazuriz stated, "*…in addition to protecting the urban landscape and the goodwill of the neighborhoods, the new law takes care of the most important: the health of people in a precautionary manner as recommended by the World Health Organization, setting strict limits on the powers of the antennas. Chile is setting standards in this regard."*

The Irish Department of the Environment, Community and Local Government has a webpage on Electromagnetic fields which directs people to the advice of the Chief Medical Officer.

"Advice from the Chief Medical Officer on mobile phone use: We may not truly understand the health affects of mobile phones for many years. However, research does show that using mobile phones affects brain activity. There is general consensus that children are more vulnerable to radiation from mobile phones than adults. Therefore the sensible thing to do is to adopt a precautionary approach rather than wait to have the risks confirmed.

In the light of these findings, the Chief Medical Officer of the Department of Health and Children strongly advises that children and young people who do use mobile phones, should be encouraged to use mobile phones for "essential purposes only" All calls should be kept short as talking for long periods prolongs exposure to radiofrequency electromagnetic fields.

All mobile phone users can reduce their exposure to radiofrequency energy by making fewer calls, reducing the length of calls, sending text messages instead of calling, using cell phones only when landline phones are unavailable, using a wired "hands free" device so that the phone need not be held against the head and refraining from keeping an active phone clipped to the belt or in the pocket".

Read the Advice of the Chief Medical Officer of Ireland.

Irish Doctors Environmental Association

The Irish Doctors Environmental Association wrote a statement in 2013 concerning health concerns with Wi-Fi in school:

"We urge you to use wired technologies for your own safety and that of your pupils and staff."
Read the 2013 Letter

Denmark

Denmark Board of Health states: "As a precautionary measure, the Board of Health recommends a series of simple steps you should follow to reduce exposure from mobile phones :

- Use the headset or handsfree with earbud, conversation, or use the speakerphone feature
- When possible, use text instead of call
- Limit the duration of calls
- Did not sleep with the phone close to the head
- Limit conversations during low reception and while in transport.
- Do not cover the phone with aluminum foil, special covers, etc.
- Compare phones' SAR value. Lower SAR require less exposure
- Denmark Board of Health Recommendations on Reducing Cell Phone Radiation

Tanzania

2014: Director General of Tanzania Atomic Energy Commission (TAEC), Mr Idy Mkilaha publicly endorses precaution.

"Mr Mkilaha says that when weighing up this convenient tool with the questionable health impact control, caution and measures must be taken to reduce one's exposure from radio frequency (RF) emissions from the cell phone to prevent health hazards."

"According to TAEC, we should use hands-free devices or wireless headset to increase the distance between the phone and our heads. This is the best approach because it creates distance between us and the radiating phone...

*We should also keep phone away from us when dialling. Phones use more radiation during co*nnection time, says TAEC."

Read News Report: Tanzania: We Should Manage Our Cell Phones Properly Otherwise..

Read Tanzania Daily News: Tanzania: Need to Protect Oneself When Using Cell Phone

Read the Tanzania Commission for Science and Technology Newsletter detailing how to reduce cell phone exposure (page 11)

After complaints were raised by residents about health effects the Commission co-authored a published paper that reviews national RF level profiles of the radiation emitted from base stations. Read Review on Measured and Calculated Radio Frequency Radiation Emission From The Base Stations which states that

In 2016, Director General of Tanzania Atomic Energy Commission (TAEC), Mr Idy Mkilaha died under investigated circumstances and at this time EHT is unable to find the Reports or official warnings as mentioned in the news reports on the current Atomic Commission webpage.

Ireland

Irish Doctors Environmental Association

The Irish Doctors Environmental Association wrote a statement in 2013 concerning health concerns with Wi-Fi in school:

"We urge you to use wired technologies for your own safety and that of your pupils and staff." Read the 2013 Letter

United States

Legislation has been introduced at the state and national level. Some Communities have issued proclamations, resolutions and and started initiatives to inform the public of wireless health issues.

CELL PHONE AND WIRELESS LABELING

2014 California, Berkeley: May 12, 2015 Berkeley Adopted the Cell Phone "Right to Know" Ordinance on a Unanimous Vote. Berkeley is the first city in the nation to require cell phone retailers to provide those who purchase a new phone an informational fact sheet which informs buyers to read the user manual to learn the cell phone's minimum separation distance from the body. The text states:

"The City of Berkeley requires that you be provided the following notice: To assure safety, the Federal Government requires that cell phones meet radio frequency (RF) exposure guidelines. If you carry or use your phone in a pants or shirt pocket or tucked into a bra when the phone is ON and connected to a wireless network, you may exceed the federal guidelines for exposure to RF radiation. Refer to the instructions in your phone or user manual for information about how to use your phone safely." Full text here.

Watch a video of the historic vote featuring Harvard Law professor Lawrence Lessig.

Watch a video of testimony to Berkeley from November 8, 2011 on the need for cell phone guidelines.

Watch a video of the September 2016 Federal Appeals Court Hearing oral arguments CTIA vs. Berkeley as the CTIA tries to strike down the Ordinance. This the hearing considering whether to overturn the district court's decision that denied the CTIA's request for an injunction to block

Berkeley's cellphone ordinance.

2014 New York: Wireless Router Labeling in all Suffolk Public buildings: 12/2014 The Suffolk County Legislature passed legislation to require all county buildings to post notices that wireless routers are in use such as, "Notice: Wireless technology in use." The resolution, sponsored by Legis. William Spencer (a physician), warns that every wireless device emits radio frequency radiation or microwave radiation. It notes that studies "that have looked at the effects of low-level RFR radiation on human cells and DNA have been inconclusive." Read Press Release.

2011 San Francisco, California: A *Passed* 2011 Ordinance by the City of San Francisco required cell phone retailers to distribute an educational sheet created by the San Francisco Department of Environment that explains radiofrequency emissions from cell phones and details how consumers can minimize their exposure. However implementation was blocked after a **three year court battle.** The CTIA sued the city and settled with the City to block implementation of the Ordinance in exchange for a waiver of attorney's' fees. Although implementation was halted, the City Cell Phone Radiation Webpage remains online.

- Read the Open Letter to San Francisco Mayor and Board of Supervisors
- Read San Francisco's Cell Phone Fact Sheet is Factual
- Watch video from testimony to the City of San Francisco
- Watch video of San Francisco Supervisor discussing the Ordinance here.
- Watch a press conference with surviors speaking on cellphone health risks at the San Francisco Commonwealth Club. Cellphone cancer victims tell their personal stories and those of their lost loved ones.

PUBLIC SCHOOLS

2016: Onteora School District in New York State USA: District adopts "Best Practices with Wi-Fi **Read the April 20, 2016 Meeting Minutes Page 2.** "Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use. Always place device on a solid surface. Viewing distance should be a minimum of 12 inches from the screen. Staff was asked by the Principals to post this in areas that contain computers and devices. They are reminding staff to follow it."

2015: Ashland Public Schools, Mass (USA): The District has passed"Best Practices" to turn the WiFi off when not in use and keep devices away from the body Download Slides . Video of parent who initiated this. Video of school board member discussing the process. Read Magazine article on Ashland's Decision Here.

Los Angeles California Public Schools

- The LA School District Uses a RF-EMF Exposure Threshold 10,000 Less Than the FCC Limits: Read the RF Report the LA School District Used to recommend a cautionary exposure level. RADIOFREQUENCY (RF) EVALUATION REPORT Use of Wireless Devices in Educational Settings
- 2009 LA School Board Resolution Banning Cell Towers from schools and recommending against WiFi. Read the adopted resolution HERE. 2009 Resolution *Condemning Cell towers NEAR Schools* as was this T-Mobile Cell Tower across the street from an elementary school. Read it here.

Read the motion by Supervisors Zev Yaroslavsky and Michael Antonovich

- **2000 LA School Board Resolution Opposing Cell Tower Placement on Schools** and calling for precautions with wireless. 'Whereas, Recent studies suggest there is evidence that radio-frequency radiation may produce “health effects” at “very low field” intensities' Read it here.

SEE A FULL LIST OF PUBLIC AND PRIVATE SCHOOLS THAT REMOVED WI-FI LATER IN DOCUMENT

HEALTH ADVICE TO THE PUBLIC

2016: American Academy of Pediatrics Issues Recommendations to Reduce Exposure

The AAP has updated their Healthy Children Webpage on Cell Phones entitled *Cell Phone Radiation & Children’s Health: What Parents Need to Know.* The webpage reiterated children’s unique vulnerability to cell phone radiation stating, *“Another problem is that the cell phone radiation test used by the FCC is based on the devices' possible effect on large adults—not children. Children's skulls are thinner and can absorb more radiation.”* The AAP issued the following cell phone safety tips specifically to reduce exposure to wireless radiation:

- Use text messaging when possible, and use cell phones in speaker mode or with the use of hands-free kits.
- When talking on the cell phone, try holding it an inch or more away from your head.
- Make only short or essential calls on cell phones.
- Avoid carrying your phone against the body like in a pocket, sock, or bra. Cell phone manufacturers can't guarantee that the amount of radiation you're absorbing will be at a safe level.
- Do not talk on the phone or text while driving. This increases the risk of automobile crashes.
- Exercise caution when using a phone or texting while walking or performing other activities. “Distracted walking” injuries are also on the rise.
- If you plan to watch a movie on your device, download it first, then switch to airplane mode while you watch in order to avoid unnecessary radiation exposure.
- Keep an eye on your signal strength (i.e. how many bars you have). The weaker your cell signal, the harder your phone has to work and the more radiation it gives off. It's better to wait until you have a stronger signal before using your device.
- Avoid making calls in cars, elevators, trains, and buses. The cell phone works harder to get a signal through metal, so the power level increases.
- Remember that cell phones are not toys or teething items.
- Press Release: The AAP responds to study showing link between cell phone radiation, tumors in rats May 27, 2016 2015 AAP Healthy Child Web Page on Electromagnetic Fields: A Hazard to Your Health?

This webpage states:

“Cell Phones: In recent years, concern has increased about exposure to radio frequency electromagnetic radiation emitted from cell phones and phone station antennae. An Egyptian study confirmed concerns that living nearby mobile phone base stations increased the risk for

developing: *Headaches, Memory problems, Dizziness, Depression, Sleep problems*

Short-term exposure to these fields in experimental studies have not always shown negative effects, but this does not rule out cumulative damage from these fields, so larger studies over longer periods are needed to help understand who is at risk. In large studies, an association has been observed between symptoms and exposure to these fields in the everyday environment."

2013 AAP Letter to FCC Commissioner Mignon Clyburn and FDA Commissioner Margaret Hamburg calling for a review of RF guidelines 8/29/2013

2012 AAP Letter to US Representative Dennis Kucinich in Support of the Cell Phone Right to Know Act

Time Magazine (2012): Pediatricians Say Cell Phone Radiation Standards Need Another Look

2012, the AAP published Pediatric Environmental Health, Textbook of Children's Environmental Health 3rd Edition edited by Philip J. Landrigan, Ruth A. Etzel. Chapter 41: Electromagnetic Fields. Read it on Google Books *Chapter 41: Electromagnetic Fields* at this link page 383. Oxford Medicine Chapter 41 Link

AAP News 2011: *More study needed on risk of brain tumors from cell phone use* by Ruth A. Etzel, AAP News, Oct 2011

The California Medical Association, USAThe California Medical Association (CMA) passed a Wireless Resolution in 2014 that states :

"Whereas scientists are increasingly identifying EMF from wireless devices as a new form of environmental pollution ...

Whereas peer reviewed research has demonstrated adverse biological effects of wireless EMF including single and double stranded DNA breaks, creation of reactive oxygen species, immune dysfunction, cognitive processing effects, stress protein synthesis in the brain, altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and brain tumors; and...Resolved, That CMA support efforts to implement new safety exposure limits for wireless devices to levels that do not cause human or environmental harm based on scientific research." Read the full CMA Resolution here.

Read a the Santa Clara Medical Bulletin article by Dr. Cindy Russell that explains the CMA resolution and gives recommendations for schools.

2014: The Connecticut Department of Public Health has issued specific recommendations to reduce exposure to cellphone radiation. It is notable that the Department has provided information more in depth than the CDC, EPA and FDA in detailing 7 steps on *how* people can reduce exposure. Furthermore, the Department states *"It is wise to reduce your exposure to radiofrequency energy from cell phones whenever possible."* Read the Connecticut Department of Public Health Cell Phone Q and A about Cell phones here.

2016: Massachusetts Department of Health: Minimizing Exposure to RF

"Below are common recommendations and include those for both cell phone and non-

cell phone sources:

- Use wired communication devices instead of wireless devices
- Limit children's use of cell phones except for emergencies
- Keep cell phones and other sources at a distance
- If using wireless devices like computers, laptops, tablets, and printers, place the wireless router away from where children and adults usually spend time.

Read these recommendations from the Department of Health in full at this link.

2014 Maryland, Greenbelt: The Greenbelt Maryland City Council voted **unanimously** on November 24, 2014 to do the following:

1. Alert citizens about the fine print warnings and possible health risks of cell phones and wireless devices By sharing the Environmental Health Trusts 10 Steps to Safe Tech and Doctors Advice on Cell Phones Brochure in City health fairs and city centers.

To send the FCC Chairman a letter urging the adoption of "radiation standards that will protect human health and safety." Download the letter here.

3. To oppose cell towers on school grounds and write a letter to the local school board and County Executive.

2011 San Francisco, California: Cell Phone Radiation (How to Reduce Exposures) Webpage launched with public information on how to reduce exposures to cell phone radiation. San Francisco developed the following public health information resources:

- Answers on How to reduce exposures to cell phone radiation.
- A Poster on Cell Phones and RF Radiation
- A Factsheet for the Public
- Display stickers for Cell Phone packaging.

2012 Wyoming: Jackson Hole issued a Proclamation of Cell Phone Awareness which cites concern over long term health effects as well as the increased risk that the radiation poses to children.

2012 Florida: Pembroke Pines, passed Resolution 3362 expressing the City's "Urgent Concerns" about Wireless Radiation and Health and which encourages citizens to read their manuals and presents information on how to reduce exposure by using a headset or speakerphone. Jimmy Gonzalez, an attorney who had developed brain cancer after heavy cell use, initially petitioned the Commission.
Watch the Video of his powerful testimony here.

2010 California, San Francisco: Cell Phone Radiation (How to Reduce Exposures) Webpage launched. Answers on how to reduce exposures to cell phone radiation. The City developed a poster, factsheets and display stickers with public health information.

2010 California: Burlingame California City Council voted to include cell phone safety guidelines in their Healthy Living in Burlingame initiative (WHO classification and consumer precautions).

2010 Maine, Portland :Mayor Mavodenes, Jr. declared October "Cell Phone Awareness Month"

Colorado 2009 The Governor of Colorado issued a Proclamation on Electrical Hypersensitivity.

"*Electromagnetic Sensitivity is a painful chronic illness of hypersensitive reactions to electromagnetic radiations.*

WHEREAS, the symptoms of EMS include, dermal changes, acute numbness and tingling, dermatitis, flashing, headaches, arrhythmia, muscular weakness, tinnitus, malaise, gastric problems, nausea, visual disturbances, severe neurological, respiratory, speech problems, and numerous other physiological symptoms.

WHEREAS, Electromagnetic Sensitivity is recognized by the Americans with Disabilities Act, the US Access Board and numerous commissions;" **Read the Proclamation HERE.**

May 2009 The Governor of Connecticut issued a Proclamation on Electrical Hypersensitivity.

"*WHEREAS, the health of the general population is at risk from electromagnetic exposures that can lead to illness indicted by electromagnetic radiations; and, WHEREAS, this illness may be preventable through the reduction or avoidance of electromagnetic radiations, in both outdoor and indoor environments and by conducting further scientific research; and, "* Read the Proclamation HERE.

Broward County Florida May 2009, The Mayor issued a Proclamation on Electrical Hypersensitivity.

"*WHEREAS, as a result of global electromagnetic pollution, people of all ages in Broward County and throughout the world have developed an illness known as Electromagnetic Sensitivity; and, "*

Read it all HERE.

US Proposed Legislation

2012 National Law The Cell Phone Right to Know Act H.R. 6358 was introduced receiving strong **s**upport from many organizations including the American Academy of Pediatrics. (AAP Letter here.) This legislation called for labels on mobile devices at point of sale, a comprehensive national research program to study whether exposure to wireless devices causes adverse biological effects directed by NIEHS and the EPA and exposure level regulation.

HR 6358 received strong **s**upport from the American Academy of Pediatrics Read the AAP Letter here.

Congressional hearings in 2009 provided expert testimony to Congress. Watch CSPAN VIDEO.

Library of Congress Summary: Written by the Congressional Research Service

Cell Phone Right to Know Act - Requires the Director of the National Institute of Environmental Health

Sciences and the Administrator of the Environmental Protection Agency (EPA) to:

1. conduct or support a comprehensive research program to determine whether exposure to electromagnetic fields from mobile communication devices causes adverse biological effects in humans, including vulnerable subpopulations such as children, pregnant women, those with compromised immune systems and hypersensitivity reactions, men and women of reproductive age, and the elderly;
2. disseminate research results to the general public; and
3. report findings and conclusions to Congress.

Directives:

- Directs the Federal Communications Commission (FCC) to promulgate regulations to allow a subscriber to access personally or to give consent to allow researchers with institutional review board approval to access specific usage data required to investigate the link between electromagnetic radiation exposure and potential adverse biological effects in humans.
- Directs the EPA to promulgate regulations establishing maximum exposure level goals and maximum exposure levels for exposure to electromagnetic fields generated by mobile communication devices.
- Directs the Commissioner of Food and Drugs (FDA) to promulgate regulations to provide for labeling (including exposure ratings and the maximum allowable exposure levels and goals) on mobile communication devices, packaging, instruction manuals, and at points of sale in stores and on websites.
- Requires the Secretary of Health and Human Services (HHS) to increase: (1) the number and size of grants to institutions for training scientists in the field of examining the relationship between electromagnetic fields and human health; and (2) the number of career development awards for such training for health professionals pursuing careers in pediatric basic and clinical research, including pediatric pharmacological research.

Amends the Public Health Service Act to establish a graduate educational loan repayment program and authorize national awards for researchers in such fields.

Amends the Communications Act of 1934 with respect to the prohibition on state or local government zoning regulation of personal wireless service facilities on the basis of the environmental effects of radiofrequency emissions. Excludes from such prohibition state or local regulation based on the adverse human health effects of emissions of radiofrequency electromagnetic fields.

2015 NEW Massachusetts proposed MA Senate Bill 1222: An Act creating a special commission to study the health impacts of electromagnetic fields and Bill H2007: An Act relative to a special commission to study electric and magnetic fields. *Bills Still in Process as of August,2015.* Watch a view of the statehouse briefing on RF here.

2015 Nassau County will have a proposed Wireless Router Labeling Act that would place visible warning signs in all county buildings and facilities where a wireless router is located.. Please read recent coverage of the initiative here.

2014 The Maine LD 1013 **"The Wireless Information Act"** passed the State Senate and House but then failed to pass the second vote. The Bill requires manufacturer's information on radio-

frequency exposure be visible on the outside of the cell phone's product packaging.

- Please a video of State Representative Andrea Boland on how the legislation was thwarted.
- Read Maine's "Cellular Telephone Labeling Act" -April 17, 2015
- Read Cell Phone Radiation Label Bill Passes Maine Legislature Before Dying

The San Francisco Cell Phone Right to Know Ordinance was signed in 2011 requiring cell phone retailers to distribute an educational sheet created by the San Francisco Department of Environment that explains radiofrequency emissions from cell phones and how consumers can minimize their exposure. The CTIA sued the city and settled with the City to block implementation of the Ordinance in exchange for a waiver of attorneys' fees. The City Cell Phone Radiation Webpage remains online.

2015 Oregon HB 3350: This proposed legislation directs the Department of Education to prepare statement that discloses potential health risks of wireless technology and requires public and private schools to distribute statement to employees and parents of students. It declares an emergency effective July 1, 2015. Read the Bill here.

2015 Oregon HB 3351: This proposed legislation states that cell phones must have a visible written label that advises consumers of possible risks and steps that consumers can take to reduce the risk of radio- frequency radiation exposure from cellular telephone use. Read it here.

2014 Hawaii Senate Bill SB 2571 was introduced calling for a warning label encouraging consumers to follow the enclosed product safety guidelines to reduce exposure to radiation that may be hazardous to their health.

SB 932 California: This 2011 legislation would have required retailers to include notices on product packaging that cell phones emit radio frequency (RF) energy. A second notice would be posted at the point of sale when purchasing online or in a physical store.

HM 32, New Mexico: This 2011 proposed law request the Department of Health and the Department of Environment to study and review all available literature and reports on the effects of cell phone radiation on human health.

HB 1408 Pennsylvania: This 2011 proposed law would require warning labels on cell phones "to inform all citizens about possible health dangers that have been linked to microwave radiation that is emitted by cellular telephones and the steps that can be taken to mitigate those dangers, especially as they relate to children and pregnant women."

- Dr. Ronald B. Herberman, former director of the University of Pittsburgh Cancer Institute (UPCI) and the UPMC Cancer Center offered testimony at a PA House Democratic Policy Committee hearing. CBS Local coverage of hearing HERE. Philadelphia Tribune News coverage Here.

SB 679 Oregon: This 2011 proposed law would require warning labels for all new cell phones and cell phone packaging. Watch a news video about the law here.

H.R. 2835 In 1999 Congressman Bernie Sanders sponsored H.R. 2835 (106th): To require an assessment of research on effects of radio frequency emissions on human health.

(Note: This document does not cover ALL EMF policy but is simply a sampling. Please feel free to contact EHT to send documentation of other policy actions.)

Schools Worldwide Removing the WiFi/Taking Action

2016: Haifa, Israel: Haifa Mayor Yona Yahav(of Israel's 3rd largest city) ordered all schools to have wireless removed and replaced with wired connections. Read Krayot article. Hamodia article. Related Reshet TV Report Watch News Report with unofficial English translation Watch News Report on Supreme Court Case in Israel

2016 Lowell School, Washington DC: In the kindergarten wing, the Wi-Fi hotspots were removed and the teachers are given ethernet and adapters so that computers and class technology can be ethernet connected (corded) to reduce RF-EMF exposure.

2016 Italy: Turin Mayor Chiara Appendino laid out plans "to cut back on Wi-Fi in state schools and government buildings over concerns that radiation might damage people's health".

Read 7/2016 News Report Turin could slash Wi-Fi over 'radiation' concerns

2016: Onteora School District in New York State USA: District adopts "Best Practices with Wi-Fi **Read the April 20, 2016 Meeting Minutes Page 2.** "Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use. Always place device on a solid surface. Viewing distance should be a minimum of 12 inches from the screen. Staff was asked by the Principals to post this in areas that contain computers and devices. They are reminding staff to follow it."

2016 Italy: Mayor of Borgofranco d'Ivrea (Italy) orders Wi-Fi to be turned off in schools. "Mayor Livio Tola told the town's high school and elementary school to return to using cables to connect to the internet after reading that the electromagnetic waves given off by wireless routers were especially harmful to young children." Read the newspaper article here. Read the News article here "Ivrea, The Mayor Removes WiFi as it Could Be Dangerous".

2016: Rotokawa School New Zealand, implemented steps to minimize RF Exposure Children use ipads in flight mode on desk and parents may request that their child use an Ethernet cord. Children are taught about the health precautions as part of their cyber citizenship.

2016: Istituto Comprensivo Alighieri- Diaz in Lecce Italy has banned wifi. Their two resolutions decided: a) to ban wifi in school and install a wired system for the use of internet and b) Reject the request of the local government (Municipality) to install an antenna on the school roof for the wireless signal providing for the "Wireless city" program. The resolution also asks the Municipality to install the antenna at a reasonable distance from school.Read the official resolutions number 1 here and Resolution 2 Here.

2016: The Piemonte Region has adopted a resolution to limit EMF exposure, to limit the use of wifi in schools and be considerate to the problem of EHS people. Read about it here.

2015: Ashland Public Schools, Mass (USA): "Best Practices" to turn the WiFi off when not in use, Download Slides . Video of parent who initiated this. Video of school board member discussing the process. Read Magazine article on Ashland's Decision Here.

2016: Shearwater The Mullumbimby Steiner School, Australia, 100% Wi-Fi Free School

2016: Yallingup Steiner School Australia , WiFi Free Classrooms

2016: Linuwel School , Australia ,WiFi in some classrooms, Can accommodate children with EHS.

2016: Cairns Hinterland Steiner School , Australia, WiFi Free Classrooms (may be available in other areas)

2016: Wild Cherry School, Australia , 100% Wi-Fi Free

2015: St. Cajetanus School, Belgium: Wired Internet installed and wireless removed.

2015: Washington Waldorf School, Maryland, USA: Removed Wi-Fi Routers from Buildings, Ethernet installed.

2015: Freshwater Creek School, Australia, 100% Wi-Fi Free

2015: Lorien Novalis School, Australia, 100% Wi-Fi Free School Preschool to 12th grade.

2015: Cairns Hinterland School, Austraia, WiFi Free Classrooms for EHS

2014: Acorn Hill School, Maryland: Wi-Fi Networks removed.

2014: Friends Community School: Wi-Fi turned off in wing for lower elementary school students. WiFi routers moved OUT of classrooms into hallways for older grades to reduce EMF exposure. Ethernet wires made available in classrooms for families who want children on corded (not wireless) computers.

2014: DearCroft Montessori: Hardwired internet to younger grades, limited Wi-Fi Router exposure to older grades.

2014: Portland Waldorf School, Portland Oregon,USA, WiFi removed.

2014: Meeting House Montessori, Braintree Massachusetts, USA, WiFi replaced with ethernet.

2014: Ghent, Finland, Wi-fi banned from pre-schools and day care.

2014: UPPER Sturt Primary School, Australia. Read article. Read "No WIFI" LOW EMF School Policy.

2014: The St. Augustine School in Italy turned off Wifi and goes back to Wires.

2013 Winlaw Elementary School, B.C. Canada turned off WiFi.

2013 Te Horo Primary School New Zealand Replaced WIFI with cable-based internet.

2013 Kootenay Lakes District School Board BC (One school without Wi-Fi)

2013 Blaise-Cendrars High School, Switzerland. Teachers vote to remove WiFi.

2012 Kivioja primary school in Ylivieska Finland bans phones and minimizes Wireless.

2012: Halton Waldorf, in Burlington Vermont: Remaining free of Wireless Radiation

2011 City of Lakes Waldorf School, WiFi taken out. Minneapolis, Minnesota USA

2011 Aurora School in Ontario removed Wifi and replaced with hardwired.

2011 North Cariboo Christian School in Quesnel, B.C., removed Wi-fi .

2011 Pretty River Academy in Ontario no WiFi.

2011 Wayside Academy, Peterborough, Ontario no Wi Fi.

2010 Surrey, BC Roots and Wings Montessori removed Wi-Fi.

2010 Ontario St. Vincent Euphrasia elementary school: Parents voted to turn off Wi-Fi.

2009 HEROUVILLE-SAINT-CLAIR wi-fi networks removed**.**

Teacher Unions and Parent Teacher Organizations

2016: New Jersey Education Association (NJEA) publishes "Minimize health risks from electronic devices" in the September 2016 NJEA Review. *Adrienne Markowitz and Eileen Senn detail how to reduce physical health risks from devices including risks from radiation exposure*

- *"Keep devices away from the body and bedroom.*
- *Carry phones in briefcases, etc., not on the body.*
- *Put devices on desks, not laps.*
- *Hard wire all devices that connect to the internet.*
- *Hard wire all fixed devices such as printers, projectors and boards.*
- *Use hard-wired phones instead of cell or cordless phones.*
- *Text rather than call.*
- *Keep conversations short or talk in person.*
- *Put devices in airplane mode, which suspends EMF transmission by the device, thereby disabling*
- *Bluetooth, GPS, phone calls, and WiFi.*
- *Use speaker phone or ear buds instead of holding the phone next your head.*
- *Take off Bluetooth devices when not using them."*

2016: Phoenicia Elementary School Onteora School District, New York State

- The PTA wrote a letter to the Onteora School District calling for the Wi-Fi to be turned off as a precautionary action . Watch a video of the School Board Meetings where letter is read here. Watch videos of parents and students calling for Wi-Fi removal here.
- Read News Report: Some Onteora parents fear Wi-Fi signals in schools are harming their children.

2016: Ontario Secondary School Teachers Federation

- A new call for a moratorium on WIFI and in the Limestone School District and they have taken the issue to the school trustees in that District. "The Teacher Union's president says there is a growing mountain of evidence that WIFI can pose health risks." Andrea Loken/OSSTF District President stated in a 3/2016 news interview that, "There are thousands of published peer reviewed papers that are indicating adverse health effects from WIFI and we are seeing an increased awareness around this issue worldwide." Watch the video of the news piece with Union members here . Read the National Post article here. Radio Canada International article here.

2016: Elementary Teachers Federation of Ontario

- A 3/2016 News Report states that they are calling for a "WIFI moratorium until further health studies are done, and lawmakers can catch up with new regulations." Watch the video of the news piece with Union members here . Read the National Post article here. Radio Canada International article here.

2014 United Federation of Teachers (Teachers, nurses and professionals working in New York City).

- In 2014 their Wireless Radiation Webpage stated "Wireless radiation is emitted by the myriad of wireless devices we encounter every day. It was once thought to be relatively harmless. However, we now know that wireless radiation can cause non-thermal biological effects as well, including damage to cells and DNA, even at low levels. Curiously in March of 2016, this statement was removed and replaced with new text mimicking FCC verbiage. However the site *still posts* how to reduce exposure.
- Resources posted on their site include Dr. Moskowitz' Reducing Your Exposure to Wireless Radiation and the BabySafe Project brochure What You Need to Know About Wireless Radiation and Your Baby. "Taking certain precautions around wireless radiation is appropriate for our most vulnerable populations, including pregnant women."

2014 New York State Teachers Union NYSUT: A federation of more than 1,200 local unions.

- "We have enough evidence to justify taking action and we are not willing to wait until our members, their children and the students suffer health consequences from not doing anything," - Paul Pecorale, Vice President of the New York State United Teachers Union.
- Read the Press Release on Best Practices For Schools prepared for NYSUT
- Download the Guidelines for Safer Use of Wireless Technology in Classrooms Published for NYSUT
- NYSUT hosted a Webinar: Risks of wireless technologies and protecting children and staff in schools.

2014 National Education Association

"The National Education Association believes that all educational facilities must have healthy indoor air quality, be smoke-free, be safe from environmental and chemical hazards, *and be safe from hazardous electromagnetic fields."*

"Students and/or their parents/guardians, education employees, and the public should be

notified of actual *and potential hazards."*

"School districts should conduct periodic testing for harmful water *and airborne particles/agents* that are detrimental to the health of students and education employees and shall report the results publicly."

"The Association also believes in the development and enforcement of health and safety standards specifically for children." **Read Section C-19 of the NEA 2013-2014 Resolutions**

2013 Canadian Teacher Federation's Brief **(200,000 elementary and secondary school teachers)**

- "CTF is concerned about the lack of definitive research regarding the adverse health effects of Wi-Fi.
- "We propose a prudent approach to the use of Wi-Fi, especially where children are present."
- "We recommend an education program regarding the relative safety of Wi-Fi exposure and that appropriate resources be developed to educate the public regarding ways to avoid potential exposure risks of Wi-Fi access points and devices."
- "Pedagogical needs could be met in schools with an approach that limits exposure to Wi-Fi."
- Read the Briefing The Use of Wi-Fi in Schools - Briefing Document

2015: Canadian Teacher's Magazine published *CTF Sounds the Alarm on Wi-Fi*

2013 United Teachers of Los Angeles, representing 40,000 teachers and staff

- Resolution passed: "I move that UTLA will abide by current National NEA Policy for Environmentally Safe Schools which states that all employees and stakeholders should be informed when there are changes in their exposure to environmental hazards including electromagnetic radiation and that all stakeholders and the public should be notified of any actual and potential hazards. UTLA will advocate for technological solutions that maintain technology upgrades while not increasing employees exposure to electromagnetic radiation."
- Health and Human Services Committee 3-6-13 #1: Moved by Kevin Mottus, seconded by John Cabrera.
- See UTLA Newsletter editorial by social worker Kevin Mottus.

2013 Elementary Teacher's Federation of Ontario - over 76,000 teachers

"There is cause for concern for members' health and safety, especially women," said Sandra Wash, a teacher representing the Peel district when the Federation issued a 2014 position statement supporting an Expert Panel recommendation that Health Canada provide the public with more information about radiofrequency energy, and the safe use of wireless technology. ETFO voted to:

- Turn cell phones off in classrooms
- Label the location Of Wi-Fi access points.
- Research Radio Frequency radiation.
- Develop a hazard control program related to wireless microwave radiation through JHSC.

2012 The Ontario English Catholic Teachers Association (45,000 Ontario teachers)

- Recommends a wired infrastructure as WIFI "may present a potential Health and Safety risk or hazard in the workplace...The safety of this technology has not thoroughly been researched and therefore the precautionary principle and prudent avoidance of exposure should be practiced."
- Read the Position Statement here. "Controls for WiFi would best be guided by the ALARA principle (As Low As Reasonably Achievable), as well as by applying the concept of prudent avoidance (of non-ionizing radiation)."
- Read CBC News article

2013 BC Teachers Federation adopted Wireless Resolutions and Proposed Resolutions

- "The BCTF supports members who are suffering from Electromagnetic Hypersensitivity by ensuring their medical needs are accommodated in the workplace."
- Proposed Resolutions "the World Health Organization's classification of radiofrequency/electromagnetic fields emitted by wireless devices as a 2B possible cancer risk to humans; that the BCTF ensures all teachers have the right to work in a safe environment, including the right to work in a Wi-Fi/ wireless-free environment."
- Recommendation to the Ministry of Education that school boards "begin immediate installation of on/off switches for Wi-Fi routers in schools, thereby reducing microwave radiation exposure and reducing health risks to members, and/or provide safer Ethernet cables or fibre optics". Read the Wireless Resolutions and Proposed Resolutions
- Read Daily News Coverage:Merritt teachers demand protection from wi-fi radiation 'Evidence is piling up that wi-fi radiation may in fact be harmful'
- Read the Vancouver Sun News Report Here.

2013 The BC Confederation of Parent Advisory Councils (BCCPAC) **of 821 Advisory Councils representing over 500,000 parents in British Columbia passed two resolutions.**

- Resolution 17 "calls on each Board of Education to have one public school at each education level that is free of Wi-Fi, cordless phones and cell phones. This school will only be equipped with wired computers and wired telephones for personal, educational and administrative purposes."
- Resolution 18 calls on Boards of Education to "cease to install Wi-Fi and other wireless networks in schools where other networking technology is feasible." passed with a clear majority.
- Read Resolution On/Off switches for WiFi Routers and Protocol for the Use of Wireless Devices

2010 UK VOICE ;The Union for Education Professionals- 20,000 members

- "Voice has advocated that new Wi-Fi systems should not be installed in schools, that existing systems should be turned off when not required and that schools should consider whether they really need to use Wi-Fi, which was developed to facilitate Internet access on the move rather than to be used as a convenient alternative to cables in dedicated IT facilities."
- " In the light of what has happened to one of our members *[who has developed sensitivity to*

electro-magnetic radiation], I am concerned that so many wireless networks are being installed in school and colleges without any real understanding of the possible long-term consequences."- Voice General Secretary Philip Parkin

- Read their Position Statement read their Blog post.

Los Angeles California Public Schools

- The LA School District Uses a RF-EMF Exposure Threshold 10,000 Less Than the FCC Limits: The OEHS supported a precautionary threshold level that is 10,000 times lower than the current Federal Communications Commission standard. Read the RF Report the LA School District Used to recommend a cautionary exposure level. RADIOFREQUENCY (RF) EVALUATION REPORT Use of Wireless Devices in Educational Settings
- 2009 LA School Board Resolution Banning Cell Towers from schools and recommending against WiFi.
  - "The Board supports responsible deployment of fiberoptic broadband technology which is superior to wireless in speed, reliability, security, durability and protections it affords people and the environment from the potential hazards of exposure to radio frequency radiation."
  - Read the adopted resolution HERE.
  - Read the Press Release here LOS ANGELES BOARD OF EDUCATION MEMBERS VOTE TO PROHIBIT CELL PHONE TOWERS NEAR SCHOOLS
  - 2009 December Resolution *Condemning Cell towers NEAR Schools* as was this T-Mobile Cell Tower across the street from an elementary school. Read it here.

"As long as questions exist as to the adequacy of these federal regulations, local governments should have the ability to include consideration of health and environmental effects of these facilities." (referring to cell towers) Read the motion by Supervisors Zev Yaroslavsky and Michael Antonovich

2000 LA School Board Resolution Opposing Cell Tower Placement on Schools and calling for precautions with wireless. 'Whereas, Recent studies suggest there is evidence that radio-frequency radiation may produce "health effects" at "very low field" intensities' Read it here.

2010 Greater Victoria Teachers' Association

"The GVTA recommends a precautionary approach to the School District with regard to provision of wireless internet in schools. The precautionary approach comes from the environmental movement and has been adopted as common practice in areas regarding potential environmental, ecological or biodiversity damage. It suggests that the lack of significant evidence is not enough of a reason to be unconcerned. The fact that many other countries have instituted regulations to protect children, seniors, pregnant women and other susceptible populations should be the guide for a District policy on WiFi installation and use in the worksites."

The GVTA Wireless in Schools Webpage states now that:

- Wi-Fi free zones should be available.
- On/Off routers recommended and record any adverse Wi-Fi health effects.

- Minimal or non-use within elementary schools.

2008 Lucerne Elementary Secondary Arrow Lakes District SD 10 New Denver BC, Canada Opts for "No WIFI

2001 Fletcher Hills PTA Resolution submitted to the California State PTA

- "RESOLVED, that the California PTA supports local municipal zoning setback rules of at 1000 feet or more from an operating wireless transmitter and a school or residential area; and be it further
- RESOLVED that the California PTA supports encouraging schools to use cable lines for all communications services on campus and to avoid the endorsement, purchase or use of wireless local area network systems on campus; and be it further
- RESOLVED that the California PTA recommend that teachers and students should limit use of cellular phones or other mobile devices on school property to emergencies and that cellular phones, pagers and other mobile phones be turned off and placed out of sight while the individual is on school property"
- Resolution on Wireless Equipment/Cellular Phones and Antennas Read it here.

DOCTORS AND SCIENTISTS APPEAL FOR STRICTER WIRELESS TECHNOLOGY REGULATION

Vienna Resolution 1998 Salzburg Resolution 2000 Stewart Report, UK 2000 Declaration of Alcalá 2002 Catania Resolution 2002 Freiburger Appeal 2002 Bamberger Appeal 2004 Maintaler Appeal 2004 International Association of Fire Fighters Resolution on Cell Towers 2004 Coburger Appeal 2005 Oberammergauer Appeal 2005 Haibacher Appeal 2005 Pfarrkirchener Appeal 2005 Freienbacher Appeal 2005 Lichtenfelser Appeal 2005 Hofer Appeal 2005	Helsinki Appeal 2005 Parish Kirchner Appeal 2005 Saarlander Appeal 2005 Stockacher Appeal 2005 Vancouver School Resolution 2005 Benevento Resolution 2006 Allgäuer Appeal 2006 WiMax Appeal 2006 Schlüchterner appeal Brussels Appeal 2007 Venice Resolution 2008 Porto Alegre Resolution 2009 European Parliament EMF Resolution 2009 Dutch Appeal 2009 Int'l Appeal of Würzburg 2010 Copenhagen Resolution 2010 Seletun Consensus Statement 2010 Russian National Committee on Non Ionizing Radiation Protection 2011	Potenza Picena Resolution 2011 World Health Organization 2011 Austrian Medical Association 2012 Resolution on Electromagnetic Health 2012 British Doctor Initiative 2013 BabySafe Project: Joint Statement on Pregnancy and Wireless Radiation 2014 Canadian Doctors Declaration to Health Canada 2014 Scientific Declaration to Health Canada (International Doctors) 2014 International Scientists Appeal to U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology 2015 *Over 200 Scientists*

INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS

DIVISION OF OCCUPATIONAL HEALTH, SAFETY AND MEDICINE

"The IAFF opposes the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is

proven that such sitings are not hazardous to the health of our members."

The IAFF Official Position *Against* Cell Towers on Fire stations passed in 2004 iaff.org/HSFacts/CellTowerFinal.asp.

- This Position was initiated after increasing complaints among firefighters with cellular antennas on their stations coupled with the California study showing neurological damage in California firefighters conducted by Dr. Gunnar Heuser. Read the Press Release on the Resolution and Research Study here

L.A. County Firefighters Local 1014

- Local 1014 has a webpage dedicated to stopping towers because of a plan to install them on over 200 of their stations. http://www. stopcellphonetowers.com/index. Html
- "As firefighters and paramedics, we live in these firehouses. What effect will these towers have on us? What are the risks to our neighbors? It's a no-brainer that LA County should at least have done a proper study before before putting 200-foot high-power microwave antennas on top of our heads."

- Dave Gillotte, Active Duty Fire Captain

President, LA County Firefighters Local 1014
Watch him testify on this issue here.

- *The Firefighter's Website in 2015* http://www.stopcellphonetowers.com/index.htm

United Firefighters of Los Angeles City Local 112 IAFF-CIO-CLC

Opposes Cell Towers on Their Stations.

- "It is inexcusable that once again our firefighters in the field were the last to know about a massive 150 million dollar project that could jeopardize their health and safety. ... nobody talked to us and we have not heard from one single expert who has told us that this project will be safe."
- "UFLAC will strongly oppose the use of Fire Stations as base locations for cell towers and/or antennas "

DownLoad the letter from this LA Firefighters Union Local 112 asking for an immediate halt to cell towers on fire stations.
Watch videos the these Firefighter Union Presidents testifying to the LA Board of Supervisors on the Issue here.

Comments from Rebecca Smith

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From: Rebecca Smith

Sent: Thursday, December 15, 2016 3:06:52 PM

To: Genevieve Walker

Subject: A New Paradigm in EMF Science

Please see attached document file.

I am a descendant of an atomic US veteran, former US Army Reserve Combat Electrician and for many more years was a US Navy air traffic controller, and then an FAA air traffic controller, I assure you I am quite sane and recently completed four graduate degrees in aeronautical science including Space Studies, I am an electromagnetic hypersensitive female, diagnosed at age 55 by functional MRI imaging. This condition is a global problem.I have quite a voluminous assortment of supportive documents. Attached is a most recent article written for the engineering sector.

Sincerely, Rebecca Smith

From: Rebecca Smith

Sent: Wednesday, December 21, 2016 6:31 PM

To: Genevieve Walker

Cc: Andrew Bielakowski; Amanda Pereira; Salerno, Jennifer [USA]; Claudia Wayne

Subject: Re: A New Paradigm in EMF Science

Please see also attached documents.

On Thu, Dec 15, 2016 at 6:49 PM, Genevieve Walker <Genevieve.Walker@firstnet.gov> wrote:

Ms. Smith- thank you for taking the time to write. I look forward to reading

your attachment. Thank you for the information.

Genevieve Walker

FirstNet

Director of Environmental Compliance

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Sincerely, Rebecca Smith

Additional References Provided

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