State	1. Do you install luminaire foundations in poor soil conditions (loose granular and/or organic soils, and in soils with high water table)?	Respondent
Oregon	YES The Oregon Department of Transportation uses the Equations from Figure C13.10-2 in Section 13.10 titled "Embedment of Lightly Loaded Small Poles and Posts" to analyze the depth of the foundation with an assumed S1 poor soil pressure. The project Geotechnical Engineer is responsible to verify that the specific luminaire locations will satisfy the assumed S1 value. When the soil is worse than the assumed S1 condition or there is water, the Geotechnical Engineer will provide recommendations for a custom foundation design. The depth will be determined by a Geotechnical or Structural designer and this information is included in the plans and specifications.	Scott U. Jollo, P.E. Traffic Structures Engineer | (: (503) 986-3069 Oregon Department of Transportation | 4040 Fairview Industrial Dr SE, MS#5 Traffic-Roadway Section | Salem, Oregon 97302-1142 http://www.oregon.gov/ODOT/HWY/TS/Pages/structures.aspx
Oklahoma	In Oklahoma, we conduct a soil report for the areas that we will install luminaire and based on that we design the footings. The length or depth of the drill shaft vary accordingly.	Tarek Ahmad Maarouf, P.E. Engineering Manager Traffic Engineering Division Oklahoma Dept. of Transportation 200 NE 21st street, Rm 2A-7 Oklahoma City, OK, 73105-3204 office: 405-522-2584 Fax : 405-521-2865
New York	YES In poor soils, we design the foundation for the conditions. Sometimes, it is just a larger version of a standard foundation, but sometimes it is a totally different solution. We have even put traffic signal poles on driven pile foundations. We prefer a reliable foundation to having to do it over when the pole starts to tilt (which has also happened).	Bob Burnett Director, Geotechnical Engineering Bureau NYSDOT, 50 Wolf Road, MP42 518-457-4711 Albany, NY 12232

State	1. Do you install luminaire foundations in poor soil conditions (loose granular and/or organic soils, and in soils with high water table)?	Respondent
Iowa	NO In Iowa, the issue is the opposite of what you have. We encounter rock and shale and switch to a spread footing in these situations. We have not developed an alternative footing for the soil conditions you have described.	Timothy D. Crouch, PE, PTOE State Traffic Engineer Iowa Department of Transportation 515-239-1513 fax 515-239-1891
New Jersey	YES We have one lighting foundation that ... is the worst case scenario state wide. Therefore our junction box foundations, JBFs, are used throughout the state. Mostly contractors install pre cast foundations due to the faster installation with less labor. We have two standard pole heights for this foundation and all designs utilize either standard height. Our lighting was made uniform many years ago. The 100 foot high mast towers require consultants to take boring samples and then provide a design that must be approved by our Geotech engineers. Otherwise our lighting is installed on the jbfs throughout the state.	Dan Black (609) 530-5383 NJDOT Electrical Operations
South Dakota	YES ...most of our soils are competent enough and free of organic material that they do not cause an issue. We do regularly encounter granular soils, sometimes loose, but certainly with high water tables. I would also like to mention that we conduct soil borings for both luminaires and traffic signals. At most traffic signal locations and occasionally at some of the luminaire locations we utilize a lateral bearing testing apparatus, developed and fabricated in-house in the late 60's, to measure the in-situ soil strength. In addition soil samples are collected and ran for classification purposes.	John Weeldreyer, PE Foundation Engineer Geotechnical Engineering Activity 700 E. Broadway Ave. (605)773-8174 SDDOT Pierre, SD 57501

State	1. Do you install luminaire foundations in poor soil conditions (loose granular and/or organic soils, and in soils with high water table)?	Respondent
Wyoming	YES	Joel A. Meena, P.E. State Traffic Engineer 5300 Bishop Blvd. Cheyenne, Wy 82009 Wydot (307) 777-4374
Massachusetts	YES Yes, MassDOT will install luminaire foundation supports in poor soil conditions.	Neil E. Boudreau | State Traffic Engineer | Massachusetts Department of Transportation - Highway Division 10 Park Plaza Suite 7210 Boston MA 02116 857.368.9655
Nevada	NO In Nevada we are fortunate to have good soil conditions state wide.	Thomas Moore, P.E. Asst. Chief Traffic Engineer Nevada Department of Transportation
Delaware	YES	Mark Luszcz, P.E., PTOE Delaware Department of Transportation 169 Brick Store Landing Road Chief Traffic Engineer Smyrna, DE 19977 P: (302) 659-4062
Nebraska	YES We do install foundations in poor soil conditions.	Carl R. Humphrey, P.E. Nebraska Department of Roads Phone - (402) 479-3842 carl.humphrey@nebraska.gov Urban & Lighting Engineer – Roadway Design

State	1. Do you install luminaire foundations in poor soil conditions (loose granular and/or organic soils, and in soils with high water table)?	Respondent
Minnesota	YES We have, but not a common issue	Sue Zarling, P.E., PTOE MnDOT OTST 1500 West Cty Rd B2 651-234-7052 Traffic Electrical Systems Engineer Roseville, MN 55113
Texas	YES	Meg Moore, PE Director, Traffic Engineering Section TX DOT Austin, TX

State	2. Do you have a standard drawing/plan that specifically addresses such conditions?	
		a. Can you send a copy or link to your standard drawing?
Oregon	NO	n/a
Oklahoma	NO	n/a
New York	NO	Our standard foundations assume soils with at least 100 pound per cubic foot density and a 30 degree friction angle. The standard drawings for those can be found here: https://www.dot.ny.gov/main/business-center/engineering/cadd-info/drawings/standard-sheets-us Section 645 is for signs, Section 680 is for traffic signals
Iowa	NO	You can look at our footing details at the following link - http://www.iowadot.gov/design/SRP/IndividualStandards/eli201.pdf
New Jersey	YES	Attached PDF
South Dakota	NO We do install footings in poor soil conditions but it is not a common occurrence. These would include both loose granular soils (occasionally) and soils with high water tables (often). We rarely encounter organic soils of significant thickness at footing locations.	No standard drawing that addresses such conditions. It is considered and addressed as needed in the recommendations provided by the Foundation Section.
Wyoming	NO	

State	2. Do you have a standard drawing/plan that specifically addresses such conditions?	
		a. Can you send a copy or link to your standard drawing?
Massachusetts	YES	Our drawings, which date back to 1968, may be found here: http://www.massdot.state.ma.us/Portals/8/docs/manuals/TrafficDetails68.pdf
Nevada	YES	
Delaware	NO Expect an effort in the near future to apply process from new Traffic Design Manual on lighting pole foundation design, utilizing soil conditions and other data, similar to current practice for signal pole foundation design.	Type 6 is our standard for lighting poles. Although our process seems to lack engineering, I am unaware of there ever being a light pole foundation failure.
Nebraska	NO We do not have any standard plans to address this. This would all be handled from the field (on–site project manager / engineer) in the few cases that we run in to.	
Minnesota	NO Not specific to poor soil conditions.	The link to the standard plate (two pages) http://dotapp7.dot.state.mn.us/edms/download?docId=1457989 http://dotapp7.dot.state.mn.us/edms/download?docId=1457990
Texas		The standard drawing for roadway illumination foundations is RID(FND)-11 ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/standard/traffic/ridfn11.pdf

State	3. Can you describe your approach to addressing such conditions? For example:			
	a. engineer the foundation using a set of poor soil assumptions – it is what it is	b. install our deepest foundation and call it good	c. don't install luminaire supports in such conditions	d. Other
Oregon	Custom foundation design based on poor soil information			
Oklahoma	custom design for conditions			
New York	Case-by-case design for conditions			
Iowa			Don't have such conditions. Design spread footings for opposite case - rocky soil	
New Jersey		Use worst case junction box foundation design statewide		
South Dakota	We typically engineer the foundation using actual soil parameters collected in the field (it is what it is). In these situations it generally results in deeper foundation.			
Wyoming	YES			
Massachusetts	Our luminaire foundations are designed for the worst case scenario. Therefore, we overbuild a significant majority of the foundations.			

State	3. Can you describe your approach to addressing such conditions? For example:			
	a. engineer the foundation using a set of poor soil assumptions – it is what it is	b. install our deepest foundation and call it good	c. don't install luminaire supports in such conditions	d. Other
	We are in the process of revising our standard drawings to provide multiple sizes for foundations based upon varying soil conditions; once this step is completed, we will expect the Design Engineer to obtain the soil conditions prior to project advertisement so that there are no field changes to the design. This is similar to how we treat traffic signal mast arm designs.			
Nevada		Our foundation for luminaires is a standard 2.5 ft x 5 ft pile and is used state wide.		
Delaware				install our standard foundation and make field revisions (e.g., make deeper, revise to spread footing) if there are concerns during installation
Nebraska		We try to make something work. We have had to pour larger foundations in sandy soil or have had to do a poured foundation rather		

State	3. Can you describe your approach to addressing such conditions? For example:			
	a. engineer the foundation using a set of poor soil assumptions – it is what it is	b. install our deepest foundation and call it good	c. don't install luminaire supports in such conditions	d. Other
		than a power foundation (screw-in) in some cases. (Generally the contractor can do either a concrete or a power foundation, unless specified.		
Minnesota				If it came back that the conditions did not fall within these categories or when in the field bad soils or rock was observed we would work with the foundations group to try to resolve the issue before we would decide that we could not place a pole at a location.
Texas				The evaluation of soil conditions is based on penetrometer measurements. From the table of recommended foundation depths on RID(FND)-11, the foundation can be from 6' to 10' in depth, depending on pole height and number of blows/ft from the penetrometer. For extremely poor soil conditions, we may have our

State	3. Can you describe your approach to addressing such conditions? For example:			
	a. engineer the foundation using a set of poor soil assumptions – it is what it is	b. install our deepest foundation and call it good	c. don't install luminaire supports in such conditions	d. Other
				geotechnical engineers evaluate the location and design a special foundation. We also could try to avoid bad locations with a different pole layout, or not install light poles at all.