

BRIEFING NOTES

NAME OF GROUP: PLANNING COMMISSION

DATE, TIME AND PLACE OF MEETING: Wednesday, August 5, 2015, 1:50 p.m., City Council Chambers, County-City Building, 555 South 10th Street, Lincoln, Nebraska

MEMBERS IN ATTENDANCE: Cathy Beecham, Tracy Corr, Michael Cornelius, Chris Hove, Dennis Scheer and Lynn Sunderman; (Cathy Beecham and Jeanelle Lust Absent). David Cary, Stephen Henrichsen, Amy Huffman of the Planning Department; Scott Holmes of the Health Department.

STATED PURPOSE OF MEETING: Briefing on **“Commercial Wind Energy Text Amendment”**

Steve Henrichsen of the Planning Department stated this is a technical briefing to go over many of the factual items as provided in the informational packets to Commissioners. Staff requests that questions of interest to the public be saved for the Public Hearing on August 19, 2015 so those in attendance can hear the answers. Because there is a lot of detailed information, this technical briefing is necessary to review definitions and other items to make sure they are understood. There will be no public comment today.

Henrichsen reviewed the organization of the informational binders given to Commissioners. All documents are available to the public online. It includes the Staff Report for the proposed text amendment and the report compiled by the Health Department which specifically addresses noise and noise studies. Under the next tab in the binder are all letters received from the public regarding the June 8th draft.

There was an initial text amendment proposed by wind Developer, Volkswind, that was slated to come forward in January, 2015. Staff decided that there had not been enough public process, so Volkswind was asked to withdraw that proposed amendment, which they did. A working group was formed that included twelve interested community members from throughout the county, plus eight members from Gage County. There were several meetings that each covered a specific aspect of wind turbine energy production. This information is all available on the website, and is also summarized by the staff report. At the final meetings in May of 2015, staff shared initial thoughts about the county regulations. On June 8th, Planning released a draft and the public had 30 days to comment, which is unusual for zoning items, but typical for Health items.

Based on all of those comments, a July 9th draft was compiled. The draft included in the staff report is the same as this July 9th draft with the exception of two areas which will be addressed

during the presentation. Letters received concerning that draft were included under a separate tab.

Under the last tab is a letter specifically addressed to Commissioners from Volkswind. It is their proposal to Commissioners on what should be adopted. Each item in the amendment is addressed to fit their alternate recommendations. There are many letters from the public in favor of and against the proposed regulations. Volkswind's was the only letter that showed the proposed amendment in entirety and offered alternatives. For ease of reference, the letter was put under a separate tab in the packet since there may be people testifying specifically on those proposed alternatives.

Henrichsen then reviewed the proposed text amendment. The first part of the staff report outlines items in the 2040 Comprehensive Plan regarding wind energy. The Comprehensive Plan is supportive of finding alternative energy sources and of being more sustainable in uses, but it also talks about protecting adjacent property owners.

Turbine height is the height from the base up to the hub height plus the length of a fully extended blade. The Steele City turbines are 262 feet from the base to the tip of blades. Some turbines proposed in this area could be anywhere from 450 to 475 feet in height. The goal is to create regulations knowing that turbines of various heights may be proposed in the county in the future.

Proposed regulations addressing both setback and noise levels are shown in the Staff Report. Setbacks alone are not the main way to protect from noise disturbances. The setback is to mitigate the impact turbines might have visually and from ice throw. Noise is regulated separately. Some have said the noise should be regulated by using a greater setback, but they are two separate regulations.

For the working group, the development of wind energy was broken down into different topics. Each was discussed in terms of whether they needed to be carried forward in the regulations. This is an effective format to follow moving forward because it explains why some things are not included.

There are economic impacts that are pros for communities and individual land owners, but there is not much use in including them in the regulations.

Part 'A' is new text about staff process. There could be a wind farm with fifty or sixty turbines spread over a large area. If a separate special permit were required every time the wind farm crossed over a public right of way, there could be 20-25 separate permits. This text allows them to be grouped together if the only thing separating them is the public right of way.

It also allows and clarifies that the lease holder can make the application since there could be multiple property holders involved when there is only one leaseholder.

Part 'B' is text that already exists in the regulations and it covers lighting. Strobe lighting is avoided and there is added prohibition for advertising on the wind turbines. There is also a requirement for a nameplate for identification and information for emergency contact.

Part 'C' is about decommissioning, which is also in the existing regulations. Details are not outlined because that is something to be worked out administratively. One addition addresses the base of the towers. There is likely to be agreement with the leaseholder to remove the tower, which has salvage value. The concrete base is enormous and deep. The proposed text specifies that the ground must be returned to at least four feet of soil between the concrete base and the ground level so there may still be some agricultural use in the future. Each base is approximately an acre, so that is not a huge loss of land, but when there are fifty or sixty, that could be many acres taken out of production if the full base remained. It does not make sense to require that it be completely removed because there may be some other structure that could go on top of it later.

Weber asked if the base would be at ground level. Henrichsen answered that they are covered but not always up to four feet. Weber asked if that meant the view is of a hump. Henrichsen said the way it is phrased, there would be two options: to go over the base with four feet of dirt, or to shave off four feet of concrete. Some communities have required three feet and some have required complete removal, but from what we understand, that would probably mean the project could not go forward because no one could afford to go back in and remove the entire base.

Scheer asked how close turbines can be to each other. The proximity of foundation to foundation might have an impact on future utilities. Henrichsen said that they tend to be thousands of feet from one another, though that is not specifically regulated by setbacks. The wind turbines impact each other so they tend to be placed far apart.

Henrichsen said shadow flicker is a new item addressed in the regulations. The purpose is to mitigate the impact of the long, flickering shadow the turbines cast at certain times of year on a nonparticipating property. He explained that in some cases, there are different standards that apply to the participating landowners who have signed a lease agreement with the developer vs. nonparticipants who have not, and there are attempts to protect nonparticipating landholders. For those who do not participate, the experience of a shadow going past your window consistently can cause annoyance. Based on review from other communities, it was decided that the standard that it flicker should last no more than 30 minutes in a day, and no more than 30 hours in a calendar year. It is possible to model how long the shadow will be cast based on topography, so the developer is asked to model that up front. This is also a standard

where a complaint could be made and potentially investigated. If an error was made in modeling, the developer would have the option of shutting off the turbine during those times of year to cut down on the flicker.

Henrichsen went on to say that environmental concerns would be dealt with as an applications are made. They will be reviewed to make sure there will be no impact to threatened or endangered species. It is important that native prairie and grasslands be given consideration even if they are not specifically listed on endangered lists. There is an entire state process that looks at environmental impacts so many specifics did not need to be addressed by these regulations.

Henrichsen said ice throw is something that can be calculated. It was more of a concern in the past when ice would build up and be thrown a great distance. Now, most developers have extremely expensive machines and do extensive monitoring to avoid damage caused by ice, so nothing separate was needed about this topic, particularly given the minimum setback is 1,000 feet.

There is language to make sure specific view corridors, as identified by the Comprehensive Plan, are not interrupted. There will be individual landowners who will say that their own beautiful vista is ruined by turbines, but regulations focus on vistas that are identified as view corridors for the entire community as a whole. Setbacks will certainly help, but at 400 feet in height, turbines will still be in view. There is nothing to stop construction of tall accessory buildings that could also obstruct a view.

Henrichsen then discussed the language pertaining to setbacks. They can appear to be confusing because there are five in order to address different circumstances. It is important to acknowledge that there is a difference between a very large farm property and a small acreage. Staff decided that 10 acres is the dividing line between the two. Even though the zoning asks for one dwelling unit per 20 acres, State law allows subdivisions over 10 acres to be considered a farm, and it therefore does not have to go through the subdivision process. If the property is smaller, the setback will be 1,000 feet or 3 times the height, whichever is greater. For a smaller property, the measurement would be to the property line. For a larger property, the measurement is taken at the house itself. That is because on a large property, the turbine has the potential to be very distant from the structure, but if measured to the property lines, it could be harder to locate turbines. There are those who will say that they should be able to enjoy their own property from anywhere so the measurement should always be taken at the property line. That is part of the pros/cons discussion.

Weber asked if a nonparticipating property owner would be allowed to build within the setback. Henrichsen said that the setback is for the turbine to a house, not a house to a turbine, so the owner still has the legal right to build as long as they meet the regular setbacks. This

applies to shadow flicker as well. In discussion with the County Attorney, it was determined that if the turbine is built first, and then a house is constructed, the turbine could become nonconforming, but it would still be allowed to remain.

Corr said that if the developer is using the same footprint, it might be okay, but if the turbine were moved to a new location, then they would have to follow the regulations. Henrichsen agreed that if the turbine were moved, it would certainly have to follow all regulations.

Cornelius asked whether, if a turbine becomes nonconforming and the operator comes forward in the future with better technology, they would be allowed to reinstall. Henrichsen replied that a regular tower could be reconstructed if it is the same height. A tower that is nonconforming could go through the special permit process in order to have public hearing. It is not an automatic "green light" situation.

Henrichsen said that participating owners have who signed a lease would still follow the 1,000 foot setback to a dwelling unit. There is no requirement for three times the height.

Another setback includes a request made by the County Engineer that there be a setback equal to turbine height from any public or private roadway to prevent blockage of the road in case the turbine fell like a tree. Some communities don't have as rigorous a standard because it would be rare for a turbine to fall completely like a tree.

Hove asked if that height includes the blade. Henrichsen confirmed that it does.

Corr wondered if towers tended to collapse in on themselves, similar to cellular towers. Henrichsen said yes, that, or a blade breaks. That is based on the experience of over 45,000 turbines in the United States now.

Scheer wondered how setbacks apply in the case of a non-participant, from tower to residence, if the non-participant wanted to relocated their home. I don't understand if there is a minimum distance they would have to abide by. Henrichsen said there is the standard 50' side yard setback that they would have to follow. Hypothetically, that could put them something like 650 feet from a tower. Because the tower was there first, the tower becomes nonconforming. There is nothing stopping a property owner from building, but it also does not mean the tower has to go away. Scheer said it is the owner's choice to do that, but it does make use of part of the property undesirable for that use. Henrichsen said that is correct. That would be the discussion for the public hearing, to address that it could make it less desirable to build, even if they still have the legal right. That could also be an issue for future subdivision.

Hove wanted confirmation that there is nothing to stop the owner to build anywhere once the tower is built. Henrichsen that is correct. They can legally build, as long as they follow the normal setbacks.

Sunderman noted that nonparticipants could potentially build within the setback, but the setback for participants is 1,000 feet. He asked if participating owners can come back and build at a lesser distance than the original setback. Henrichsen said that participating owner is within the boundaries of the special permit and as such, the special conditions of the permit would be enforced, including that no house can be built, even though participating, within the 1,000 feet. Sunderman commented that that is interesting. Henrichsen said some communities may not have any setback for participating landowners.

Cornelius asked for the rationale for that and if it is related to safety. Henrichsen said staff felt it was appropriate to have a safety standard for ice or shadow, but the setback is more about the visual impact, because there is also the separate noise standard. This is a fairly conservative standard.

Henrichsen went on to say that one thing Commissioners will hear about is the potential impact to property value on adjacent land. Staff did not include specific legislation regulating that. In Lancaster County where there are a lot of acreage lots, if you are not participating, we acknowledge that it could have an impact on the value of your lot, but there is no particular regulation that they be granted a tax reduction or be reimbursed financially in that circumstance. There is a new standard proposed under Section H that says that after the setbacks and noise contours are mapped, there must be at least three acres remaining outside of those areas. If that three acres does not remain, the turbine must be relocated. So nonparticipants should be left with at least three acres, at the very least. There should be something up front that acknowledges that there should be at least some part of the property that can be buildable.

Henrichsen concluded by saying that there was discussion about emergency response, but staff is not proposing any particular regulations regarding that.

Scott Holmes of the Heath Department came forward to present information about noise regulations. He started with the existing regulations, which only address noise from the device itself. They refer to a decibel dB(A) level of thirty-five, and that level is established at the property line. The current regulations also require a noise study by the proponent of development prior to construction, so that is also not a new proposal in the text amendment. It exists now.

Holmes said that after reviewing hundreds of pages of research studies and combined article reviews by expert panels in multiple locations, staff came up with health-based standards for

wind turbine noise. What we established was a 40 dB(A) level measured over ten minutes in the day, and 37 dB(A) measured over ten minutes at night, with the allowance that if there is a background noise level higher than that, they could go 3 dB(A) higher than that. So if they are located next to a highway, for example, they could be 3 dB(A) louder than the existing background noise. Another big change besides significantly relaxing the noise standard from 35 is that it is measured at the dwelling unit and not at the property line. That is to establish a health based standard where people spend most of their time.

Corr asked what the average dB(A) level of something like Hwy 77 would be. Holmes replied that during busy times, it could be between 60-65 dB(A).

Scheer noted that going from 35 to 40 is a significant relaxation of the standards. He asked if the increases are exponential or geometric. Holmes said that noise is measured in dB(A), which is the level we hear. The doubling of sound levels correlates to the human ear as about ten dB(A). So something that is 35 is half as loud as 45. It is a logarithmic scale when measured. Holmes said the proposed text amendment is the requirement for a noise study to model the turbine and its impact on the surrounding area and not just to measure the existing noise level.

Holmes said there is not an overarching noise ordinance in the County, so a process by which a noise complaint would be handled was needed. We felt those should go to the County Board to determine the validity of complaints and the follow-up action that is the most appropriate.

Holmes reviewed definitions that will be frequently used in understanding sound levels for the public hearing on August 19th.

Cornelius clarified that “Leq” refers to level and not frequency. Holmes agreed. With sound, the duration is the amount of time, the level is the dB(A), and the frequency is expressed in hertz or, high and low.

Weber asked if, since the sound levels are based on an average over ten minutes, they could fluctuate between approximately 60 dB(A) and 0 dB(A) and that could average at the required 37. Holmes said that over a ten minute period, that is correct. The longer you extend those periods of time, the more variability could be in the sound that could be of extreme levels that would average out over time.

Holmes went on to say that annoyance is what will be discussed often. In a definition, it is “a feeling of displeasure evoked by a noise” and “any feeling of resentment, displeasure, discomfort and irritation occurring when a noise intrudes into someone’s thoughts and moods or interferes with activity”. The relevance of annoyance is more than irritation. A noise that annoys someone may include physiological reactions such as changes to the central nervous system and biochemical changes that can actually be measured through change in heart rate

and blood pressure. Hearing impairment is considered another possible consequence, but is mostly likely not from turbines.

Hove asked if annoyance builds up over time. Holmes said that it can. It can also be associated with more than the noise, which is particularly true with turbines. There is the visual presence, not just the sound, so there is quite a bit of literature that indicates that both parts of that – visual and noise – factor in to annoyance.

Holmes said that annoyance is subjective, but it can be measured objectively by asking people with physiological changes, blood pressure, cortisol levels. Annoyance correlates to many factors such as appearance, opinions, frequency, control over the sound, and the ability to get away from it.

Holmes stated that the sound generated by turbines is fairly complex. There is more than one moving part. One of the key noise factors is the blades swishing through the air. They also pass the turbine tower which causes a reverberation that bounces from the blade to the tower and back out which is referred to as a thump or pulse. The nacelle, which generates the electricity, produces a whirring sound. All of these increase with wind speed. A turbine blade passing through the air will generate over a 100 dB(A) of sound. The transformer located near the wind energy system can also generate a hum sound.

Cornelius clarified that the 100 dB(A) mentioned is subject to the inverse square law and it is the sound generated at the specific spot of the turbine. Holmes said correct. Cornelius added that the level of sound drops off with the square distance. Holmes, yes, so the further away you get from it, it begins to drop off rapidly. He added that the infrasound dissipates at a lesser level. The sound is complex and it is not like traffic noise or airport noise. It is its own unique kind of noise.

Harris asked whether or not the noise from the wind itself drowns out some of the increasing levels of sound. Holmes said that to characterize it as “drown out” would not be accurate. That is part of the issue with this type of noise. Turbine noise is not easily covered by other noises, unlike most noises which have another source near them. A noise with a lot of modulation will be heard over other noises and is hard to mask.

Cornelius said that is the “broadband” quality of it and it is not easily cancelled out by other noises. Holmes said it is because it has modulation. In other words, it creates tonalities that our ears hear and our bodies can sense. It is not just a mix of all kinds of noise that comes out sounding more neutral.

Holmes said that sound changes with distance. Doubling of distance usually reduced the sound by approximately 6 dB(A). Surrounding surfaces can affect that. For example, if there is a lot of

snow, there could be more dissipation. The mid and high range frequencies fall below the range of audibility fairly rapidly, whereas low frequencies can travel long distances. Super infrasound levels can go 6 miles easily. It is a long wave that goes through objects instead of bouncing, similar to ocean waves. Multiple turbines also can create a modulation effect. They are typically located apart from each other in lines.

Cornelius asked what causes the infrasound frequencies. Holmes said there is not a lot of clarity as to whether it is coming from the nacelles, the generating unit or the bump off the top. They generate sounds that are below human hearing range. One helpful thing identified is that the dB(A) sounds correlate with the infrasounds. And the good news is that dB(A) is easier to measure.

Holmes continued, saying that most complaints are associated with the swishing pulses, the modulation and tonality, and with night-time operations. The complaints are not about how loud the turbine noise is. Comparisons to noise levels from more typical sound sources are not helpful. No one is saying that at a distance turbine noise is too loud. The complaints are about sleep disruption, ear pressure and things that people feel, not hear. It's not how loud the sound is, it is about how annoying it is. In studies, it has been determined that wind turbine noise is more annoying, even at lower levels. The percent of people highly annoyed from turbine noise begins to rise rapidly above 35 dB(A). Once you go above 45, you see high levels. In the large Health Canada study on two provinces, the levels between 40 and 45 were highly annoying to about 6% to 16% of people. The relevance is if that is that you are choosing the level of annoyance. At a certain level, you can almost guarantee that a certain percentage will be annoyed or highly annoyed.

Hove asked if noise levels are also measured at distances away, such as the 1,000 feet. Holmes said that what we proposed is that the measurement would occur at the outer wall of the dwelling unit. The developer would do a noise modeling study, and they would have to show that they could meet the noise regulations at the proposed location of towers.

Sunderman asked how the ambient noise is factored in. Holmes said the regulations allow for the additional 3 dB(A) above ambient noise levels, so if you have a home that is already affected by a certain level of noise, such as along a highway, noise studies could identify that level on average and have 3 dB(A) above.

Scheer asked if it is possible that a dwelling could be affected by more than one, since with wind farms, turbines are often clustered. Holmes said yes. Sunderman asked if there are studies that talk about synchronization of the sound. Homes said most developers have the turbines fairly synchronized now, but if you look at multiple towers, there is a different distance, so no matter how synchronized they are, it will still have a different impact.

Weber asked what the thought process was on the additional 3 db(A) allowance. Holmes said the reasoning is fairly simple in terms of how noise works. People can detect noise that is 3-5 db(A) above what they normally hear.

Henrichsen asked Holmes to elaborate on how complaints will work

Holmes said complaints would go to the County Board. They would determine the validity, the number, and whether or not a noise study should be required. Since there is no general noise regulation for the County, there is no designated agency to do that. This would require the owner of the turbine to hire professional consultation to do that noise study and monitoring. It is very complex and requires very specific equipment that the City and County do not currently own.

Corr asked for clarification about who would pay for the study. Holmes said the owner of the wind development. Sunderman added that would only occur if the County Board deemed it necessary. Holmes said that is correct.

Sunderman asked if these complaints would be reviewed during the County Board's regular meetings. Holmes said he assumes the actual determination would likely be made during the meeting, though review of the complaint could be logged and reviewed beforehand. He went on to say that he has dealt with hundreds of noise complaints in the City. Some are valid and you have to figure out the best use of resources to pursue that complaint.

Henrichsen said for the public hearing on the 19th, he will not present much more information. Health Department will have a bit more on the health studies and why the dB(A) levels were picked. We will both be here to address questions. In terms of format, people will sit through the normal part of the Planning Commission meeting first.

Harris asked if someone elected to build after the turbine was already there and they applied for a building permit, if there is there some type of notification system to let them know they are within a certain proximity to a turbine and the implication of that. She wondered if there is there some mechanism to shift that burden of responsibility of that choice to the property owner. Henrichsen said yes, and given the height, if they build within a certain distance, it is safe to assume they will see the turbine, the same way they would be aware if they chose to build near a busy highway or railroad. It is up to the property owner to determine if those factors will have impact on them or not.

Henrichsen went on to say that the last sections refer to the road agreements that are made with the County Engineer to protect roads during construction. Often road improvements are done just to serve the construction. Several people in the working group asked about County liability if anything ever did go wrong with turbines. The County Attorney addressed that on

concluded from existing court cases that the County is not liable because they approved a Special Permit for a wind turbine. The entire ordinance with strikeouts and new language is available in the packet.

Hove asked if these proposed changes are very similar to other surrounding counties. Henrichsen said that staff reviewed ordinances for many Nebraska counties and others nationwide. Many communities take an existing ordinance and simply copy it over and customize it for their area. In Nebraska, many allow a much higher dB(A) level. Many are now going to a setback based on turbine height. The 1,000 foot distance was based on 90% of other ordinances, but there is no information on why that number was picked initially, but we thought of it as a minimum to address visual impact, ice throw and shadow flicker.

Sunderman asked if, after construction of the turbine, it is possible for a nonparticipating landowner to build closer to a turbine than a participating landowner. Henrichsen said that is correct because a participating owner is within the boundaries of the special permit. Some will say that participating should be allowed to be closer. You will also hear that about sound levels. Our recommendation is based on health impacts, whether owners participate or not. Sunderman said he is having a hard time getting his hands around the idea that the restrictions are stricter, in a way, for a participating landowner than a nonparticipating, as far as building a dwelling is concerned. Henrichsen said that they have chosen to lease the land out. Based on existing wind farms in other counties, typically those with turbines own a larger number of acres. He noted that a map is available on the website to guide visitors to a spot where the visual impact of the turbine can be ascertained. The sound impacts are still difficult to grasp on a short visit because the annoyance may not be caused in that short time.

There being no further discussion, the meeting was adjourned at 2:25 p.m.