

MEETING RECORD

NAME OF GROUP: PLANNING COMMISSION

DATE, TIME AND PLACE OF MEETING: Wednesday, July 18, 2018, 1:00 p.m., Hearing Room 112 on the first floor of the County-City Building, 555 S. 10th Street, Lincoln, Nebraska

MEMBERS IN ATTENDANCE Tom Beckius, Tracy Corr, Tracy Edgerton, Deane Finnegan, Cristy Joy, Chris Hove, and Sandra Washington; Maja Harris and Dennis Scheer absent. David Cary, Steve Henrichsen, Tom Cajka, Rachel Jones, George Wesselhoft, Geri Rorabaugh, and Amy Huffman of the Planning Department; media and other interested citizens.

STATED PURPOSE OF MEETING: Regular Planning Commission Hearing

Vice Chair Corr called the meeting to order and acknowledged the posting of the Open Meetings Act in the room.

Corr requested a motion approving the revised minutes for the regular Planning Commission hearing held June 20, 2018. Motion for approval made by Hove, seconded by Beckius and carried, 7-0: Beckius, Edgerton, Finnegan, Hove, Joy, Washington and Corr voting 'yes'; Harris and Scheer absent.

CONSENT AGENDA

PUBLIC HEARING & ADMINISTRATIVE ACTION BEFORE PLANNING COMMISSION:

July 18, 2018

Members present: Beckius, Corr, Edgerton, Finnegan, Hove, Joy, and Washington; Harris and Scheer absent.

The Consent Agenda consisted of the following items: **SPECIAL PERMIT NO. 17039, SPECIAL PERMIT NO. 18026 and SPECIAL PERMIT NO. 18027.**

There were no ex parte communications disclosed.

Beckius moved approval of the Consent Agenda, seconded by Finnegan and carried, 7-0: Beckius, Edgerton, Finnegan, Hove, Joy, Washington and Corr voting 'yes'; Harris and Scheer absent.

Note: This is FINAL ACTION on SPECIAL PERMIT NO. 17039 and SPECIAL PERMIT NO. 18027. This is a recommendation to the City Council on SPECIAL PERMIT NO. 18026.

CHANGE OF ZONE NO. 18009, TO H-3 (HIGHWAY COMMERCIAL DISTRICT, PUD) WITH VARIOUS WAIVERS, INCLUDING APPROXIMATELY 19.52, ON PROPERTY GENERALLY LOCATED IN THE VICINITY OF THE FORMER MISSOURI PACIFIC RAILROAD CORRIDOR BETWEEN VINE STREET AND NORTH 66TH STREET:

July 18, 2018

Members present: Beckius, Corr, Edgerton, Finnegan, Hove, Joy, and Washington; Harris and Scheer absent.

Staff Recommendation: Approval.

Corr disclosed that she forwarded a letter from Meadowlane to the Planning Department that was delivered to her.

Staff Presentation: George Wesselhoft of the Planning Department stated the justification for changing the zone in the areas is to remove the existing I-1 zoning that was a carryover from when this corridor had rail line. That line was abandoned in the 1980s and the trail was established in 1992. The areas are now commercial in nature rather than industrial. Additionally, it is likely there will be residential development so removing the I-1 zoning will eliminate potential conflicts with any future residential or commercial projects. All existing businesses are still permitted in the proposed H-3 district. The PUD will allow all existing buildings to follow current parking and setbacks. Future developments could request changes at the time of application, such as height, and other similar waivers. This was a City-initiated application and Staff contacted all neighbors well in advance of submitting the application, spoke with owners in April of this year, presented at a Meadowlane Association meeting, and that neighborhood provided a letter stating they do not oppose.

There are two letters in opposition. One is from Finke Nursery and the other is from the property owner of an undeveloped parcel located in the northwest corner of the application area. They argue that this change would remove their ability to market their properties for some industrial uses. Staff response is that there is a broad range of uses permitted under H-3 zoning. Finke also requested to expand the change of zone to include the area farther to the east; they own the railroad corridor up to 70th Street. That would be a legitimate request, but is beyond the boundaries of this application. In the case of the other parcel, only a minimal area will be impacted by setback regulations.

Washington noted that there is a sliver of Finke's property that the City proposes to change from R-2 to H-3. Wesselhoft said that is just an adjustment of the zoning line to make it parallel with the back side of their building.

Washington said there were also concerns with the tree service portion of their business would not be allowed. Wesselhoft said they can continue any use incidental to growing trees, landscaping, and consulting and contracting. If a new tree service were proposed as its own entity, it is true that would not be permitted. Their concern was more generally the loss of industrial uses.

Corr asked if the tree service use would be grandfathered in if it was currently part of their business. Wesselhoft responded that it would.

Corr asked for more information about expanding the change of zone to N. 70th Street. Wesselhoft said they could propose that apart from this application. This legal ad and subsequent report did not include that area. Staff's intent is simply the removal of the industrial zoning. Corr asked if Finke would need to submit a separate application, including payment of the associated fees. Wesselhoft said that is correct.

There was not public testimony on this item.

CHANGE OF ZONE NO. 18009

ACTION BY PLANNING COMMISSION:

July 18, 2018

Hove moved for Approval, seconded by Washington.

Washington encouraged the City to reach out to Finke to consider their proposal. It seems like a good idea to neaten up the boundaries.

Edgerton said it makes sense to remove Industrial zoning to protect the surrounding areas.

Corr said this is a smart move to clean this zoning up in the middle of the City, where there would be potential conflict with residential uses.

Motion carried, 7-0: Beckius, Edgerton, Finnegan, Hove, Joy, Washington, and Corr voting 'yes'; Harris and Scheer absent.

Note: This is a recommendation to the City Council.

**PRELIMINARY PLAT NO. 18003, TO MODIFY THE SITE NOTE REGARDING THE TIMING OF THE
ASTER ROAD CONNECTION RELATIVE TO PLATTING ADDITIONAL LOTS, ON PROPERTY
GENERALLY LOCATED AT W. SILVERADO COURT AND HIGHWAY 34:**

July 18, 2018

Members present: Beckius, Corr, Edgerton, Finnegan, Hove, Joy, and Washington; Harris and Scheer absent.

Staff Recommendation: Conditional Approval.

There were no ex parte communications disclosed.

Staff Presentation: Rachel Jones of the Planning Department stated this is to amend the Highland View Preliminary Plat. Silverado is currently the only access. It is temporary in the sense that it will be removed once there are two permanent access points into the neighborhood. Currently, no more than 115 lots can be platted until paved road connects to surrounding street networks. The planned connection will be Aster Road, which will connect east into Fallbrook. Under the existing plan, no additional lots can be platted until the road is constructed. The applicant requests to revise the note to state that the road must be "under construction" rather than built, to allow two final plats to move forward, for 58 new lots. The preference from Staff is that this language be tied to approval of Executive Order (EO), since the terminology "under construction" does not have a clear definition and provides no

guarantees for the neighbors. The EO will provide surety that the work will be completed within a certain timeframe, typically one year. The applicant has agreed to this. There have been several letters received in opposition.

Edgerton asked why the EO process is requested. Jones said it is through the EO process that the City approves work for public improvements.

Edgerton asked if the current access will remain open once Aster is constructed. Jones said that is correct. Edgerton wondered where the second permanent access will be. Jones said that is yet to be identified. The applicant can speak to the proposed timing of Aster Road.

Washington asked what the assurances are that the road will be constructed in a timely manner. Jones said the EO is a legally binding agreement in which money is posted as surety for the improvement. It has a deadline built into it. Corr asked whether the applicant loses the money if they do not meet the deadline. Jones said that is correct. The money could then be used by the City to fulfill the construction of the improvement.

Beckius asked of the timeframe. Jones said she will defer to Public Works, but it is her understanding that the EOs have been submitted and are under review. Washington asked if platting and sale of lots will occur once the EO is approved. She wondered if there will be more houses constructed before the completion of the road. Jones said the applicant can better address their development schedule.

Robert Simmering of the Public Works Department stated EOs typically have a 1-year deadline. This is impact-fee eligible, so once built, the developer has the right to be reimbursed for expenses as funds come in, which is another motivating factor to completing work on time. The surety is a liability from day one, so the only way to get rid of that liability is to be timely. We want this connection made to give the neighborhood another way in and out.

Beckius asked if there are any thoughts on shortening the length of construction time. Simmering said that can be done.

Applicant Testimony:

1. **Mike Eckert, Civil Design Group**, came forward representing the developer, Starostka-Lewis. They were not the original developer when this area was approved in 2005. As the recession approached, the bank foreclosed on the former owner. They are currently at their 115-lot limit. Aster Road was started last year. It has taken a huge amount of fill because there is a projected overpass over the highway, so the developer entered an agreement with the neighboring Fallbrook owners to grade with them. The grading cost \$400,000 and the paving will be \$500,000. It will take 300 lots to pay the developer back for these costs. The goal is to do a 3rd addition to finance this project. The neighbors have alerted us to several concerns. Some can be addressed by us, and others are not related. The timing for construction of Aster is imminent; in fact, we are willing to shorten the EO deadline to six months from the approval date. Creating a second permanent access is not easy due to the

fact that the surrounding areas are under different ownership. The development process takes time, so Aster Road will be constructed by the time there are additional occupied homes.

Finnegan asked if the roundabout is already in place. Eckert said no. The roads are paved up to the roundabout spurs. There are significant utilities under the location that this developer will install. There is also a large water main that had caused delays. Everything is ready to go now, so we ask that the 3rd addition be allowed to be platted.

Corr asked about paving in the areas to the north. Eckert said there is no road to connect to so there needs to be continued development first. Corr commented that she does not want there to be additional occupation of homes until the road is done. Hove asked for confirmation that the road can be done in six months. Eckert said that is the goal. Hove noted that any houses would take longer to be built. Finnegan asked how many of the existing platted lots have built houses on them. Eckert said that of the 115 lots, there might be around a dozen that are not built. Edgerton asked what this request does for the applicant, from a commercial standpoint. Eckert said it provides more income by creating more sellable lots.

There was no testimony in support.

Opponents:

1. **John Irons, 1620 Silverado Court**, stated he and his wife met with Planning last fall and were told the street would be done. The biggest problem is from Silverado Court to Lander. There are 9 houses with 19 kids between the ages of 6 months and 9 years old. This area was supposed to be a cul-de-sac. Parents have a lot of fear because this area is not safe for play. There is lack of trust in the developer. All they have to do is sell lots; then there is no control over when the houses are actually constructed. They would rather exit the neighborhood by Super Saver.

2. **Lee Towle, 1230 Lander Drive**, said lack of trust is an issue. They have been told the road would be paved many times and it is yet to be done. He fears for his teenaged drivers. He understands the need for this, from a business perspective, but his concern is safety. The neighborhood has even considered a speed bump to slow drivers down.

Hove asked what other options might be more satisfactory to neighbors than the guarantee of the EO. Towle said there is nothing to stop this developer from platting the lots and selling them. The contractor could build homes before the road is finished. They have been promised results several times; actions are louder than words.

3. **James Bitz, 1557 W. Lander Drive**, stated it is frustrating because everyone in the neighborhood has genuine concerns and it does not seem that much is being given in response. The number of lots keeps increasing. At some point, there will be a number of homes that will make the single entrance dangerous. What if there were an emergency situation where the neighborhood needed to be evacuated? He asked what the absolute number of lots that can be built before another access is provided. More accountability is expected from kids doing their chores. They are frustrated as a family because they were

given an idea of how the neighborhood would develop when their children were small. Now, five years later, their kids are reaching the age where they will not want to play outside much longer. He is worried about the elastic nature of notes and definitions included in the proposal.

Corr asked that the question about the maximum number of lots that will be allowed to be built before another access point is added be clarified. Mr. Bitz responded that they would like to hear a specific number to be put on record.

4. Greg Gayman, 1540 W. Lander Drive, reiterated concerns about accountability, safety, and emergency access. He added that with additional construction vehicles, there will be alarming deterioration to the temporary road that will need to be addressed. He believes the developer could have budgeted for the road construction. Traffic during the Kawasaki shift changes creates long wait times, sometimes up to 15 minutes, to exit and enter the neighborhood safely. This also creates unsafe lane changes. Nebco's portion has also gone unfinished.

5. Doug Ivey, 1530 W. Silverado, said also has traffic concerns, particularly since oncoming traffic travels at 60 mph. If the road could be built by fall, that would be great.

Staff Questions:

Beckius asked if the applicant has reached the 115 lot limit. Jones said that is correct. Beckius wondered what forces them to make the connection with Aster Road. Jones said that at this point, they cannot plat any more lots until the road is built. The money held as surety required by the EO will be held until the improvement is built. Beckius noted that if the developer did not want to pursue any subsequent phases, Aster might not be connected any time soon.

Beckius asked for more information on the EO process. **Tim Sieh, City Attorney's Office**, said the Executive Order is used when the City authorizes the developer to complete public improvements. It creates security in the form of a bond or letter of credit, for example, so that if the developer does not comply, the City can execute the bond and make the improvements using the money that was held. Hove noted the timeline that has to be followed.

Washington asked if the City has any concerns about a 6-month timeline. Sieh replied there is concern only to the extent that he does not know where in the process this particular EO is. He would want to make sure it was approved before offering any assurances as to the due date.

Edgerton observed that accepting the terms of the EO would actually move the project forward faster. Sieh agreed that without the EO, there is nothing to force the developer to follow through.

Washington noted that even when Aster is complete, it does not create the second entrance that allows the temporary access to be closed. Edgerton noted that even if the temporary entrance remains open, the new connection seems safer. Simmering said that since the

temporary access exists, the terms require what could be considered a third access, before the temporary closes, for a total of two permanent access points. It is an issue of public safety to have more than one access. Finnegan said that after driving out to the location, she agrees that the exit from Silverado is really terrible.

Corr asked the maximum number of lots that can be constructed before the second permanent access has to open. Jones said they are capped at 400 until the second permanent access is in place, then the temporary access could go away.

Corr followed up by asking the number of maximum lots allowed to be built before Aster Road is completed. Jones said 115. Washington asked if approval today would mean the developer could plat more than 115 lots before Aster is done. Jones said that is correct.

Corr noted that the definition for “under construction” is not clear. Jones said that is the reason Staff requires the approved EO instead of that language.

Washington asked how the 6-month time limit could be added to the conditions of the EO. Sieh said that can be done as a Motion to Amend

Applicant Rebuttal:

Eckert said the neighbors have good questions. As Staff stated, 115 lots are allowed with the single access and 400 would be allowed with 2 permanent access points in place. It is possible some realtors could have misrepresented or misunderstood the situation. There is nothing that requires that Aster be built, so the EO is a good guarantee for the neighbors. The developer has completed much of the infrastructure in the 3rd Addition and has paid for the grading. There are several factors in this area that have caused delays. If Aster is built, that will provide relief at Silverado. The developer wants to move quickly on this and is agreeable to the 6-month time limit from the approval date of the EO, so long as the neighborhood does not appeal this decision.

Corr asked for more information on how far along in the process things were. Eckert said the design plans have been approved. Paving will be approved in a few weeks. He is not sure of where the EO is in the process.

Washington asked the location of the 400 lots. Eckert noted that the majority of the subdivision is included. There is potential for a connection to Fallbrook. He suggested the neighborhood work with the City to secure funding for the septic connection. Aster is the only option for this developer.

Beckius commented on the fact that this developer has secured right-of-way along NW 12th Street.

Corr commented that this area has had problems due to the change in ownership, the recession, and a number of other factors. Eckert added that the number of lots has not changed. Corr asked when the ownership changed. Eckert said it was in 2010 or 2011. Corr asked if this developer owns the entire subdivision. Eckert said no, and that is part of the conundrum with creating access to other areas.

PRELIMINARY PLAT NO. 18003

ACTION BY PLANNING COMMISSION:

July 18, 2018

Beckius moved for Conditional Approval, seconded by Joy.

Beckius moved for a friendly amendment to his motion to add the 6-month completion deadline, from the date of execution, on the associated executive order, unless the neighborhood appeals the Conditional Approval. Hove seconded.

Beckius finds this to be a good solution to the problem of the perceived dragging of feet by the developer. The EO process is the means for securing this connection.

Finnegan agreed that this is the best of options. It holds the developers feet to the fire.

Hove agreed this solves the need for additional connection by ensuring the timely constructions of Aster Road.

Corr said the EO will protect the neighborhood and the road will get built. This can be a confusing process so she hopes this will alleviate some of the issues.

Tim Sieh noted that the first item before this body is action on the Motion to Amend made to the main motion.

Motion carried, 7-0: Beckius, Edgerton, Finnegan, Hove, Joy, Washington, and Corr voting 'yes'; Harris and Scheer absent.

Rorabaugh called the main motion, as amended.

Motion carried, 7-0: Beckius, Edgerton, Finnegan, Hove, Joy, Washington, and Corr voting 'yes'; Harris and Scheer absent.

Note: This is a **FINAL ACTION** unless a letter of appeal is filed in the Office of the City Clerk within 14 days.

[Break 2:40 P.M.

Meeting Resumed at 2:50 P.M.]

COUNTY SPECIAL PERMIT NO. 18025, FOR CONSTRUCTION OF A COMMERCIAL FEEDLOT, ON PROPERTY GENERALLY LOCATED AT 13350 WEST WITTSTRUCK ROAD:

July 18, 2018

Members present: Beckius, Corr, Edgerton, Finnegan, Hove, Joy, and Washington; Harris and Scheer absent.

Staff Recommendation: Conditional Approval.

Finnegan disclosed that she left meetings when this topic has come up. The topic has also been brought up in various casual interactions.

Washington stated that she contacted the Natural Resources Conservation Service asking for a report. When she realized their officer sent a letter in opposition, she closed down her communication.

Hove noted that he has also had to shut down discussion of the topic as it came up during casual conversations.

Staff Presentation: Tom Cajka of the Planning Department said the ownership has changed on this parcel. The original application listed Denton Storage, LLC as the owners with Randy Essink as applicant. He has now purchased the property. The Staff Report has been amended to reflect this change. This parcel is just over a mile east of the Lancaster/Saline County line and is also just outside of the zoning jurisdiction of Crete. The boundaries of the special permit are smaller than the boundaries of the parcel itself, so this use would only be permitted within the smaller area. The application is for four 63' x 600' barns, each housing 47,500 chickens. Within a quarter-mile of this property, there is one other house. Within a half mile, there are three homes. Within a mile, there are 25 houses. Staff was informed that there are additional homes within the outer circumference within Saline County. The application was reviewed by the County Engineer who has restricted truck traffic to only go west on Wittstruck. At this time, they do not find the need for a road maintenance agreement, since the applicant has stated the average number of trucks per day is only 1.5. The application was also reviewed by NE Department of Environment Quality (NDEQ) and the Lower Platte South Natural Resource District. Heath Department staff is here to address concerns for odor.

Chris Schroeder of the Health Department, stated that odor emissions from confined animal feeding are prohibited. Reports of odor are not considered violations if the land owner/operator is using all reasonable techniques to control odor, or if the person filing the complaint is not the land owner where the offense is reported. It is also the case that if a person moves to the area after this use is established, their complaints would not be considered a violation. According to NDEQ, under Title 130, this operation does not meet the thresholds that require them to obtain the construction and operation permits. As part of that, they would have to submit a nutrient management plan to address how waste is handled. If a complaint is received by the Health Department, staff would contact NDEQ, who will conduct the inspection and determine if there is lack of compliance. If corrections are not made, eventually, then we would work with an attorney to pursue enforcement action. There are also fugitive dust rules where any dust crossing property lines would be grounds is prohibited.

Edgerton noted that none of the thresholds are met for requiring certain permits, but if the applicant submits the nutrient management plan, that will be approved and overseen by the NDEQ.

Beckius asked about enforcement measures. Schroeder said after a complaint is made, staff will do the due diligence to make sure it is a valid complaint. Then they will work with the operator to remove the nuisance. If that is not accomplished, then steps to take legal action moved forward.

Washington questioned how the term “reasonable” is defined, as it applies to agricultural nuisances. She asked for more information about Nebraska Bill No. 106 which outlines a decision matrix to help County officials establish appropriate thresholds. Cajka responded that LB 106 provides that direction for Counties to use if they so choose. As of last year, only two counties had adopted that as part of their requirements – Merrick County and Dodge County.

Corr wondered if inspections happen annually or are complaint driven. Cajka said they are complaint driven.

Hove asked if there have been any complaints about similar operations in the County. Schroeder said he did not find any, and none of the air quality staff recall receiving any. Beckius asked how long that operation had existed. Schroeder said three years. Corr asked how many animals are there. Cajka said they have 5 barns with 125,000 chickens and 14,000 turkeys, so they are smaller in size. They are located just south of Waverly. He is unsure if the design of their barns is similar.

Cajka added that another point that has come up is the Right to Farm Act which protects existing farms from nuisance lawsuits from new residents.

Washington asked for more information about the requirement and review of the nutrient management plan. Schroeder said that requirement is part of a contractual agreement between the operator and Costco. Washington noted NDEQ is not requiring the plan. Schroeder said that is correct.

Washington referenced the comment about storm water control in the letter from NDEQ. Schroeder said that relates to discharges to the waters of the State and refers mainly to the construction phase. Once up and running, the barns should not discharge anything to the waters of the State. Cajka clarified that the construction storm water plan is required at the time of building permit and has to do more with preventing runoff during the construction phase. That is a separate issue from the potential runoff from manure.

Edgerton commented that the applicant is submitting the nutrient management plan despite the fact that they are not required to do so by the NDEQ. She wondered if it would be submitted prior to acquiring the building permit. Cajka said the County does not require that. It is his understanding that Costco requires that of all of their farms. Once submitted, the farm must meet the requirements and review.

Hove asked if Staff knew how many homes would have the barns in the sightline of their property. Cajka said the topography is hilly, but he does not know.

Applicant:

Randy Essink, 355 West 1st Street, Cortland, NE, came forward as applicant with his fiancé and child. They purchased this property with the goal of moving there and raising their family. If this permit is granted, they will grow broiler chickens. They will be very close to the barns and would not be interested in the project if they thought it would be detrimental or a health risk. We are confident that we will cause no harm. He has a small farm in Gage

County. He also works full time and is required to travel often for work. This permit would allow him to work from home. The term "commercial feedlot" is misleading as all of these barns are enclosed. All of the litter is contained until it is removed to be spread on fields. The barns look like machine sheds.

Finnegan asked if the intent was to raise chickens when they purchased this property. Essink said yes. Finnegan asked if he contacted Costco. Essink said a good friend of his told him about the opportunity. After attending many meetings and asking lots of questions, they decided it was a good choice for them. Finnegan asked when they plan to move to the property. Essink said as soon as his house sells. Finnegan asked if he was surprised by the negative reactions. Essink said he expected some, with all of the media, but not this much. Finnegan asked if he has spoken with neighbors. Essink said he has had conversations with four farmers who would like access to the fertilizer.

Washington said several comments expressed concern about potential expansion of the operation. She asked if there were any plans to do so. Essink said they are not planning to expand. This is plenty to meet their financial needs.

Washington asked for more information about the removal of the litter. Essink said that they are required to abide by their nutrient management plan. The litter is stored under cover in the barns, removed once per year, and hauled directly to fields. The litter is treated between flocks to seal the ammonia. It serves as an insulation. Washington expressed concerns about the amount of litter that will be generated. She wondered how many farmers are willing to take the fertilizer. Essink said he believes it is around 1,200 tons per year. Two farmers are lined up to take all of it.

Andy Scholting, Nutrient Advisors, clarified that he was originally listed as an applicant, which is incorrect. He is an advisor to the applicant and is present to answer questions from that position. He stated that the flocks are kept for six weeks of the 8-week cycle. The litter is treated and monitored. Once it reaches 140 degrees, it is turned to kill pathogens and then spread out to serve as bedding for the birds. Nutrient Advisors works through the permitting and environmental responsibilities with each producer. They help them to understand how to manage and comply, environmentally. He has extensively toured several poultry farms. The litter is extremely dry at only 15-20% moisture; that is significantly less than for other animals. The composting is designed to reduce odor and kill pathogens; basically, it controls the things that are commonly considered nuisances. Having visited several operations, he is amazed how effortlessly the public and this industry can coexist.

Beckius asked if the conditioning of the litter can be adjusted if necessary, and what the floors of these barns is like. Scholting said the composting can be adjusted because the worst thing for a producer is to have wet floors. Essink said the flooring is clay based. Beckius asked for confirmation that there will be no outdoor storage of the composted litter outside of the barns. Essink said that is correct. He cannot say 'never' because at some point the litter is removed from the barns for field applications. He does not control what happens to the fertilizer at that point.

Washington asked when the annual clean happens. Essink said it depends on when farmers want to apply the fertilizer. That would normally be in the fall or spring. Scholting said that if the litter is composted every 8 weeks, over the course of 12 months, it has gone through the process 10-12 times. Washington wondered if there is protection on the inside edge of the barns to prevent runoff. Scholting said the barns have concrete walls and are impermeable.

Finnegan asked who Scholting is contracted with. Scholting said they are hired by Premium Poultry to work with their growers. Finnegan asked how many employees will be at this location. Essink said he may have to hire part time help.

Finnegan asked for information about the mortality shed. Scholting said you walk through the barns daily to remove dead animals. They go to the mortality shed where they are also treated to be composted. Finnegan asked Essink if he is comfortable with the number provided by the advisor regarding litter production per year. Essink said he is. Joy asked where the mortality shed is located on the plan. Essink said it is the 10' x 40' building.

Hove asked if Essink has put together a business plan for the financial details of this operation and whether he has experience raising chickens. Essink said he does not have experience. He has gone over the finances with his banker. Hove asked why this location is the best. Essink said he had NDEQ look at the property and they found this to be a "perfect" location based on air and water quality concerns. Corr asked if multiple locations were considered. Essink said this site was for sale and is in proximity of his other farm, so they did not look at other properties.

Washington asked how many birds are being permitted for. Scholting said 190,000. Washington asked for more detail about the waste calculations. Scholting said each bird produces 2.2 lbs. of waste per cycle. Multiply that by 6 and divide by 2,000 lbs. amounts to 1,254 tons. That is the litter as a product, including the additives.

Corr asked for more information about the flooring. Scholting said this site is primarily on clay soil with a heavy and deep subsoil base. The site of the barns will be leveled and compacted. The primary transport factor for particulants is water and these buildings are underroof, similar to a house. Corr asked if there will be advisors helping with and teaching the necessary skills for the operation. Scholting said absolutely. Poultry is not a big industry in Nebraska right now and many are new to it. They will work with the farmers the entire time.

Washington asked how much experience Nutrient Advisors has with this type of poultry production. Scholting said they have experience in the layer industry. This type of operation is new to the area. He has traveled extensively to see exactly how this industry looks. Washington asked if the focus has been on the design of the facility. Scholting said Costco has their blueprint of what this looks like. Our role is to help growers find a suitable site and look at zoning requirements. Washington asked what led to this site. Scholting said Mr. Essink found the site and worked with NDEQ. Nutrient Advisors also review the sites and they have denied sites based on water, zoning, or environmental factors. The site of the barns was moved on this site. Washington asked Essink what led him to this site. Essink said he entered a purchase agreement.

Finnegan asked if the profit in this industry comes from selling the birds. Essink said it is a contract. Costco owns the birds; he owns the land and does the work.

Edgerton asked if Nutrient Advisors is more inclined to find sites favorable based on the fact that they are in counties with fewer regulations. Scholting said many counties have the same regulations. The biggest issue is setbacks. At a minimum, they expect operations to have a setback of a quarter mile. Most counties ramp up from that distance.

Proponents:

Walt Shafer, 33 W. 4th Street, Fremont, NE, stated that he has been involved in this project almost from the beginning and has been in the chicken business for 35 years. He leads this project in his role to manage and get things up and running over a long period of time, on behalf of Costco. This is the first product of its kind in the world, where the retailer is their own supplier. After due diligence, Nebraska was selected based on the proximity to corn growth, water supply, and the state's strong roots in the AG industry. Chickens are the most efficient protein animals in the world. It takes 100 chicken to equal one feedlot animal. This is a scientifically-based product using cutting edge technology. He is here to educate people about the industry and to assure them that the impacts will not be as great as initially perceived.

Edgerton commented that it seems like better communication for this project, broadly speaking, would have been helpful. Shafer said this industry is not well understood here since it is new. Mr. Essink is going to invest over \$2.3 million for the four houses. They will supply him a return of around \$95,000 per year, after expenses. Experts will be at his farm until it shuts down, long into the future. He will always have people to help with the technology and husbandry. These barns do not produce odor or dust plumes. If any operator were not complying, we will terminate the contract with them. Finnegan asked why there was not more education ahead of time. Shafer said his staff visited with several County Boards. They will be located in 14 counties. It will take 125 growers to do this. Odds are, there are only 4-5 counties within the appropriate distance from the production facility. Once there are enough growers, there will be no further expansion. Finnegan asked if Mr. Shafer lives here in Nebraska. Shafer said his home base is in Harrisonburg, Virginia, but he has been through the entire process here in Nebraska.

Hove asked if it is safe to say that a person with no experience can manage an operation like this. Shafer said that in some ways, having no experience will make for a better producer since no "bad habits" will be in place. Hove asked why this location is so great. Shafer said he has employees who make sure sites are in compliance, especially since the County does not have requirements. Engineers look at excavation costs. Essink's site has met requirements. There is not much development in the area, it is zoned AG, and the farmer owns the site. The entire water system is close-looped. These are not the operations seen years ago.

Washington wondered what the experience would be for a person walking up to one of the barns. Shafer said the barns are tunnel ventilated and air blows from one end to the other, especially if it is hot. If you walk within 10 feet of the vent, you might smell it; 25-30 feet

away, you will not smell it. The mortality rate for birds is 3 percent. Of that percentage, a third will die in the first two weeks. Even the smell around the compost bin is not noticeable at a distance.

2. Lynn Steuer, 2486, Hwy. 33, Crete, NE, stated their family owns land all around this parcel. Animal agriculture means a great deal to farmers in this area. They contribute a great deal to the tax base, thus supporting schools and communities. A recent goal is to increase soil health and reduce use of synthetic fertilizers. Litter is a 90% nitrogen source that can replace commercial fertilizers in a safer way. Like it or not, farming has become a big business. The new technology is amazing. Both people with 20-acre lots and farmers should have equal rights. Farmers have a vested interest in the land and would not want anything detrimental coming in. These new acreages need to find a way to coexist with modern farms. This is an emotional issue and there have been some wild claims about this operation that are not true.

3. Will Keech, 5105 Hickman Rd., Hickman, NE, came forward as Director of Livestock Development at Alliance for the Future of Agriculture in Nebraska. They stand beside the Essink family. Row crops are tough right now and returns are down, even for the best producers. This is a chance for young families to enter this field and to bring the next generation back to farming. We understand concerns about property values, but nationwide studies are inconclusive where one location cannot be compared with another. He provided a copy of an article "Impact of Livestock Expansion on Property Values" (See Attachment #1)

Finnegan recalled an approval made by this body near Firth last year. Keech said that is an egg laying facility. It is somewhat similar in that the surrounding housing is similar.

4. Willow Holoubek, 3031 M Rd., David City, NE, stated she is a lifelong farmer. There are concerns when there is the absence of knowledge about a new project like this. It is gratifying to see the poultry industry grow in Nebraska. People worry about health problems but studies have been conducted showing that particulates do not travel far from these barns. These houses will have the least impact of any protein animal operation in the state. As a representative of Lincoln Premium Poultry, Willow distributed a packet of information (See Attachment #2)

Edgerton asked what role Ms. Holoubek plays. Holoubek said she has worked for the NE Department of Agriculture, the Farm Bureau and commodity groups. The world eats a lot of protein. This will have a \$1.2 billion positive impact on the state.

5. Emily Skillet, 543 W. Jennifer Dr., Lincoln, NE, stated she is a Lincoln Premium Poultry employee. There are already several poultry operations in the county. Local farmers and service techs will be hired in this industry. This industry is vertically integrated so there are no independent producers; contract production is not new and is done all over the United States.

6. Russell Miller, 341 S. 52nd Street, Lincoln, NE said the opposition is a clear case of "not in my backyard". His question is, where does the "yard" begin? Where do the numerous concerns raised by the opposition begin? This land has been used for agriculture since the

1890s. The Comprehensive Plan identifies this land as AG. Due diligence would reveal that feedlots could be allowed. Why must the farmer be asked to lose value by not developing in ways that work for them? Miller provided a copy of his testimony (See Attachment #3).

[Break 4:50 P.M.]

Resumed at 5:00 P.M.]

7. Andy Scholting, Nutrient Advisors, stated he intended to provide his initial presentation, but was asked to come forward to answer questions during Applicant testimony. Under County regulations, AG land is designated for agricultural uses and preservation, limiting urban sprawl. All of the proper reviews have occurred and this site is appropriate for this use. There are discrepancies between results of the siting matrix done by various organizations and member of the public. (See Attachment #4A). There can be 94 percent assurance that there will be no annoying odors (See Attachment #4B). There is also a tree shelter on the property. Even the registered wells were investigated.

Opponents:

1. Pam Wakeman, 15751 Bobwhite Trail, Crete, NE, said they own 300 acres in Saline County, within a 1-mile radius. There are many contradictions being made about regulations. Health and NDEQ say they are anti-pollution; this operation seems counterproductive to that goal of protecting the land. Costco seems to have more requirements than the County. She hopes the Planning Department considers looking into the regulations; the next person may not have the same standards in place. Due to the scale of this operation, it is not AG in use, but is industrial. She provided a letter from the Office of the Attorney General of Nebraska (Attachment #5) defining large-scale AG operations as industrial.

2. Troy Henning, 11913 W. Martell Rd., NE, stated he lives 2.5 miles away. He rents pasture directly east and is concerned about the effect of the additional nitrates on his cattle, who use the creek for water. He is also concerned about an increase in predators. Finally, he wonders if he will not be allowed to make a complaint if he notices a nuisance since he is renting the land.

3. Greg Hollman, 15064 SW 128th Street, Crete, NE, said he will be able to see the all of the barns from his house. His concern is for the water. The wells are not deep and water quality is already poor in the area. There is a lot of sand in the area that is likely to plug any farming implement with a small orifice. Some wells run so low that neighbors have to let each other know when they are running irrigation; one pivot took three wells to run. What happens if a line is plugged or if there is not enough water for the chickens? He also wonders how it will effect access to water if the poultry barns are operating at full capacity. Dust from trucks will wreak havoc in the area and will cause safety problems. From his experience, odors do come from the existing poultry operations.

4. Bailey Donner, 15064 SW 128th Street, Crete, NE, stated she lives a half mile away. She is President of her FFA chapter. They are advocates for farmers. No new farms will want to come to the area if there are water issues. She worries about impact to property values. As a student, she is particularly worried about safety on roads, and dust and bugs. There is a school, church, and hospital within three miles. This will not be of benefit to the area and will cause harm.

5. Marianne Tesar, 22401 SW 114th, Crete, NE, said they own the property just to the south across the road. She misses family dinners with farm-raised food. It is heartbreaking knowing that the land will be used for a concentrated animal feeding operation. She worries about contamination, including from antibodies used to treat sick animals. Other concerns include property devaluation and inhumane treatment of animals. This is a threat to traditional family farms.

6. Ken Tesar, 22401 SW 114th, Crete, NE, stated he grew up the farm in question. He knows roads get snowed in at least twice every ten years. If access can only be taken to the west, it will be difficult to deliver supplies in or chickens out. There is a culvert to the west that will need to be replaced. The roads are narrow with many hills. The next closest roads also do not provide good access to this site. This factor should be considered across county lines. The road is also a school route and a bus and truck cannot share the road in winter.

7. Bruce Barrett, 12501 Wittstruck Rd., Crete, NE, stated he is a licensed civil engineer. The gravel roads were built appropriately for their era. Wittstruck does not accommodate truck and tractor traffic. If trips on the road increase, improvements will be needed. It is not financially practical to pave the road. He estimates the appropriate surface layering would cost Lancaster County \$96,000. The area is densely populated for a rural area and this use is not consistent with the type of farming in place. The new operation should not get to tell existing residents what percentage of the time they should have to tolerate a nuisance. He requested the input for the odor footprint as well as weather patterns used, but has not received either.

Beckius asked if, in his professional opinion, improvements need to be made with the estimated 1.4 trips per day. Barrett said he is considering times when the road is saturated. During heavy rains, trucks cannot pass. The ruts, even with cars. The County will likely take a “wait and see” approach. He added that he does not speak for agency, only for himself. They have made improvements in advance, and taken the “wait and see” approach.

8. Marina Barrett, 12501 W. Wittstruck Rd., stated this does not just affect a few people, but many. She is concerned that Mr. Essink is unable to answer basic questions about the operation of this business. Costco could afford to buy land in other areas. She does not believe the family really intends to occupy the property.

9. Janis Howlett, 13200 W. Parker Rd., said she lives directly south of the proposed operation. As a respiratory therapist, she is concerned about airborne diseases and vulnerable people in the area. She gathered research from the Bryan Hospital library. People within 2 miles of an industrial chicken farm breathe in numerous gases and particulate matter that cause both eye and lung irritation. It can exacerbate symptoms for anyone with COPD or other pre-existing condition. Chickens also carry their own diseases. There are people who are hypersensitive to avian proteins in manure and feathers. They have trouble breathing when active. This can end up being chronic. She drove to communities with large poultry operation nearby and asked people incidentally what they had experienced. They reported that it stinks and has attracted flies.

Corr asked how long people need to be exposed to develop a chronic condition or to exacerbate an existing one. Howlett said once chronic, the immune response is long-term, and there may be few or no treatment options.

10. William Howlett, 13200 W. Parker Rd., stated he has lived in the area 37 years, conserving his land and improving his property. He is disappointed that someone would install a barn like this and did not have the time to talk with neighbors, especially if this system is so well-run. People would have been neighborly, even if they disagreed. This is an industry, not farming.

11. James Schwarz, 13351 W. Bennet Rd., stated he has COPD with 60% lung capacity. He has an expensive prescription inhaler and has to be extremely careful around dust and chemicals. He does not know what effect ammonia will have on his lungs, but fears what could happen if he is out mowing and exposed for hours.

12. Robert D. Way, 801 El Avado Ave., expressed concerns about truck traffic on inadequate roads. Requiring a special permit indicates that this is a special case. This seems to be something the community is against. He respects the desire to own a small business, but questions the motivation of the people testifying in support since they were mostly employed by large business. He does not believe the number about the amount of waste that will be produced.

13. Curt McConnell, 13031 W. Bennett Rd., said the length of this meeting shows the complexity of this issue. In 2015, the matter of wind turbines came up and the County did the right thing by stepping back to take the time necessary to study the issue and come up with appropriate rules. There has been a lack of information from the applicant and Costco. Different models come up with different results. This will create a public nuisance. He applied for an open burning permit and there were more regulations holding him accountable than there are in this case for what happens to this site, should something go wrong. If this gets passed, there will be more applications from people wanting barns. Regulations should be in place before that happens.

14. Carolyn McConnell, 13031 W. Bennet Rd., said that she will be able to see and smell those barns from her yard. She has health concerns and is also worried about pollution with chemicals and hormones. Livestock waste is not required to have sewage treatment. It contaminates the air, water, and quality of life. Property values could drop. Farming is moving in the direction of going organic and pesticide free in the future. These factory operations are barbaric.

15. Tim Fowler, 12250 Bobwhite Trail, came forward representing his parents. When Lincoln Premium Poultry is ready to add more barns, they will likely look to those who already have permits. This factory farm will have drastic adverse impact on property values. This will also dramatically impact Crete Public Schools and properties in Saline County.

16. Melissa Baker, 7125 Yosemite Dr., stated her main concern is water. She provided copies of a letter from Johns Hopkins Center for A Livable Future (Attachment #6A)) and information from the Lower Platte River Basin (Attachment #6B) for the Planning Commission review. This area already faces water quality issues. Industrial zoning would be more

appropriate for this use. People have been paid and flown in to speak with Commissioners. Mr. Essink seems unqualified. The long-term effects need to be studied. Costco should not be allowed to make these decisions for the public. There are too many questions and when someone has to be held accountable, the responsibility falls on individuals, not the big companies.

17. Jim Luers, 1621 Rosebud Circle, stated that he has not heard many facts, and has more questions after attending this meeting. He questioned why the management plan is not available to the public. There is enough information about negative impacts that they should not be ignored. Other areas have kept these types of operations out. He wonders what they know that we do not. The NRD does not know if there is enough water in the area, or if this will reduce the quantity or quality. Zoning laws are meant to keep neighborhoods consistent. He is not allowed to build a second home on a 20-acre lot, but it seems someone can run a business with 200,000 chickens on the land. He wonders if anyone has visited a comparable facility.

Hove asked if he is representing anyone. Luers said no, just himself. He owns land around four miles away, but if some of the things he has read are true, this will have an impact on him.

18. Andrew Knight, 5225 S. Windleshon Ct., came forward representing the Claybaum Partnership. He questions the lack of communication. The applicant has done little to address concerns and have forced a hasty conclusion. Big business does not want their name attached to the individual growers. The farmers are the ones who bear the costs.

19. Peter Dowben, 12251 Bobwhite Tr., stated there are more homes in this area than Planning has accounted for. The best thing this applicant could do is withdraw the application. He will cause harm and neighbors will be up in arms. People may seek legal recourse. He has concerns about odor, bugs, and water consumption. Speaking as a scientist, he questions the models provided; they do not pass muster, have not been peer reviewed, and are inconsistent. On a personal note, he has a preexisting condition and while Mr. Essink may feel that his aspirations are being confronted, an operation such as the proposed could kill.

20. Gina Frank, 3053 S. 47th St., brought in a sample of chicken waste. The odor was so strong that despite being wrapped in several layers, it stunk up her car.

21. Shawn Powell, 150256 SW 128th St., stated her concern is risk to health, especially her immune-compromised grandchild. They worry they will not be able to enjoy the outdoors. She reiterated the concerns of others regarding lack of regulation, property values, road conditions and safety.

22. Elaine Woods, 15255 SW 114th St., stated one of her children has had three open-heart surgeries and has respiratory issues every winter. She worries that systems and people fail. By the time complaints are made it could be too late. There are thousands of other locations where this operation would be more appropriate. Her family's choice to live in a safe, country environment is being taken away from them if this permit is approved.

23. Donna Roller, 2000 Twin Ridge Rd., shared her thoughts about the immoral aspects of factory farming. She also worries about the environment and what legacy this will leave for future generations.

24. John Ingram, 15380 Bobwhite Tr., came forward as President of the Helsner Lakeside Estates, representing 22 homes. They live within a mile and are concerned with property values, bugs, traffic, and pollution. This type of operation would be alien to the area. Residents should not be guinea pigs.

25. Steve Sleppe, 2494 County Rd. C, Crete, NE, stated he is more confused now than before the meeting. He does not agree with this practice. Animals should be in living on the land in an open environment. This has united the neighbors. He has serious concerns about safety and road conditions related to increased truck traffic. This is also an area with a large population of migratory birds; he worries about the potential for disease to be transferred.

26. Jana Fulton, 15701 Lakeside, stated families have lived in this area for generations. They have been stewards of the land and want their children to enjoy the same things they enjoyed. She believes there has been dishonesty on the part of the Planning Department and the news releases have not given out factual information. She questioned why she would get a letter if she were not in close proximity to the proposed farm. A farmer would never disrespect the land. She asked Commissioners to step back and take a look at what this will do to the land.

Attachments from unidentified provider relating to the impact of property valuations – See Attachment #7A and #7B.

[Break 7:00 P.M.]

Resumed 7:10 P.M.]

Staff Question:

Finnegan asked for information about industrial use versus agricultural use in a farm context. Cajka said our zoning code dictates uses allowed under different districts. This land is zoned AG Agricultural District. Various uses are permitted by right, conditionally, and specially permitted. In this case, the use is a commercial feedlot, which is a specially permitted use in the AG District.

Hove asked about the size limit of commercial feedlots. Cajka said there is no restriction on size. It relates to the primary business as the raising or selling or slaughtering of animals.

Washington brought up the definition by Don Stenberg, defining a large agricultural facility as an industrial use. **Jennifer Holloway, County Attorney's Office,** stated Stenberg's definition was not related to zoning, but to electrical use. Washington observed that a facility, for electrical purposes, could be considered industrial, and still be zoned agriculturally. Holloway said that is correct. The use of those terms does not mean a facility is industrial under the zoning definitions.

Corr asked the process for mailing out notification letters. Cajka said once an application is received for a County project, letters are sent out to residents within a 1-mile radius of the boundary of the property. In this case, the boundaries of the special permit are not the same as the boundaries of the parcel. That has caused confusion about distance from the proposed project. Under this special permit, if approved, they are only allowed to operate within the boundaries of the special permit area. If they ever wanted to expand beyond that, they would have to go through the entire public process again.

Washington asked if it would be possible to build more than four barns in the application area. Cajka said they are limited to a certain number of chickens. If they put fewer chickens in each barn, it is possible, but they are still limited to that number.

Finnegan asked who regulates the number of chickens. Cajka said he is unsure.

Corr asked Staff to address the issue of two future land use maps in the Comprehensive Plan. Cajka said there is one map for Lincoln that is more detailed. It is a close-up enlargement of the County; some County area is shown, but that map is intended for the City of Lincoln. Most of the true County area is designated as agricultural uses on the land use map. Lancaster County has no zoning authority within Crete's jurisdiction.

Corr noted the numerous questions and comments about water quality and quantity. She asked if Staff has addressed that. Cajka said Staff does not know of a study specific to water capacity for fulfilling the needs of this operation.

Washington asked when or if that issue would be addressed. Cajka said that is not part of the special permit process and has not been done for previous similar applications.

Washington said she had wondered about what aspects were outside the purview of Planning Staff. She noted Health Department does not regularly monitor air quality unless there are complaints. She wondered if NDEQ would have a role in monitoring conditions. Cajka said it is correct that County Staff would not monitor any special permit.

Edgerton asked where the articles from the University of Georgia came from. Cajka said they may have come from the applicant.

Corr asked what recourse a person who rents land has for making a complaint. Is it enough if they own property elsewhere? Cajka said Health Department Staff will need to address that question. If there is a potential zoning violation, anyone can make a complaint to Building and Safety, who will then investigate. They do not investigate things like odor. Corr asked for an example of that type of complaint. Cajka said a common example is people running a business out of their homes when their property is not zoned for that use.

Applicant Rebuttal:

Essink thanked everyone for their time. His family just wants to develop their land so they can be together as a family.

Finnegan asked when the property was purchased. Essink said they were in a purchase agreement for 2.5 months and closed on June 29, 2018. He added that there is a house on the property and they do plan to live there. Corr asked for confirmation that there are no plans to build a new house. Essink said that is correct. The house needs a lot of work, but that is part of their plan.

Corr asked what happens if it rains after the litter is spread. She wondered if it contaminated water downstream. Scholting said that once the litter is delivered, it is fertilizer. Soil is sampled to determine which areas need fertilizers. It is the same as commercial fertilizers. Any larger permitted operation is required to do that budget prior to approval. Fertilizers cannot be spread if there is high risk. These fertilizers are more highly regulated than chemical fertilizers. That is a reason site evaluation is so important. We will voluntarily apply for construction operation permit. If approved, they are required to hold this accountable. There will be inspections and an extensive list of record-keeping requirements. He added that as soon as the application is submitted, it becomes public information. Their role as nutrient advisors is to make sure best management practices are in place for every aspect of an operation.

Washington asked if the litter produced will be spread on the property. Essink said he does not intend to. The barns will be occupying the only tillable land on the property.

Washington asked if there is a process for amending the nutrient management plan if there is more manure than anticipated. Scholting said yes, more land would need to be added to the plan. That would have a 30-day public notice.

Corr asked if the number of predators in the area will increase. Shafer said he would not think so. Part of their contract requires rodent and insect control. Bait boxes are provided and located along the borders of all barns. There is a \$400,000 investment made in each cycle of birds, so biosecurity is a high priority. There are also strict requirements for the treatment of the animals. If any are harmed, there is a termination clause to account for that.

Henrichsen noted that the applicant was requesting three speakers who were prepared to respond to many of the comment.

Corr asked if Costco uses local feed. Shafer said the 400,000 square foot Fremont site is under construction. It includes a feed mill and a hatchery. All feed will be made there. All inputs are sourced and purchased right here in Nebraska. They need 350,000 bushels of corn per week; it can only be stored five days. All business will most likely occur within a 100-mile circumference of the plant. That is why Nebraska was chosen.

Corr asked how the grown birds are hauled away from the growers' farms. Shafer said they process 2 million birds a week, and this is only about 40 percent of Costco's needs. The hatchery will supply Essink with chicks. It takes 21 days from egg to chick. They are delivered to the farm within 4 hours. Six weeks later, they are the exact size Costco needs. We have brought automatic chicken catching machines that gently gather the birds. Completely enclosed trucks haul the birds so there are no feathers or dust. They reach the processing plant and four hours later, they are heading out, already packaged. The entire system uses the latest technology and is very automated.

Shafer said that if they cannot get two wells to produce the 80 gallons per minute, then chickens cannot be grown. Birds will not be placed there until that capacity has been demonstrated. The second well serves as backup. The maximum amount of water used is only for mature birds in extreme conditions; 7.5 gallons per minute is the average use for the rest of the year. They stand by their estimates for the amount of truck traffic that will be generated. Many days there will be no truck. Most are for delivering and picking up the birds. The trucks are contracted with a Nebraska company. They are already experienced driving on Nebraska roads and are held accountable for safety. Most of his staff live and work in Nebraska. His son is moving here. Costco is a social conscientious company. They expect more from where their food comes from.

Corr asked for confirmation that no birds are killed on Essink's farm. Shafer said that is correct. Each house has the capability to store food so if bad weather is expected, trucks go out ahead of time. He has a lot of experience in dealing with these types of concerns. Additionally, the farmers are well-insured.

Beckius asked about the ammonia monitors. Shafer said it is expensive to test for ammonia and right now, as it is a manual test. Work is being done to automate this to improve the environment and bird health.

Scholting said many of these producers have been permitted east of the Missouri River. There have not been many asking to be producers in Nebraska yet, but the requirements are the same. There has been insinuation that information has been withheld. Much of what we do is done voluntarily. As a consultant, it is not always our role to provide the information to the public. This is a small project, from a nutrient standpoint. Beef animals produce 3 tons of waste per animal. He takes pride in his company and his work and will not exaggerate numbers. The management plan will be available to the public. Lancaster County has so many quality productive acres of farmland.

Jessica Kolterman, Lincoln Premium Poultry, came forward to say that there is an extensive list of groups that have been met with, including local councils, mayors, administrations, boards, public works, and natural resource districts, in addition to many civic groups. They are willing to meet with anyone who wants rational discussion. They value transparency and one processing facility will feature a walkway so the public can see this process. There will be a show barn so people can see the animals and have a better understanding of the production side. This will have positive economic impact on Nebraska. She would not be afraid to have one of these barns near her home because she is familiar with them.

SPECIAL PERMIT NO. 18025**ACTION BY PLANNING COMMISSION:****July 18, 2018**

Beckius moved for Approval, seconded by Corr.

Beckius said there are obviously a lot of questions. This is an applicant who has gone above and beyond. Planning Commission is not an elected body and is not always the best forum for many of these complicated questions. This will likely move on and be seen by the County Board who, as elected officials, is better suited. Agriculture is important to the county and it

is changing. It is not unreasonable to explore the impact of an operation like this. This fits the definition of an agricultural use. The area is appropriate for this use, which is not to say that it will not have any impact, but it may be less than in other areas. He intends to vote for the approval, but he may be alone.

Hove said he will oppose the motion. This is a new era of agriculture and it is a large operation. There are a lot of people who believe this should not happen in their backyards, and this resounds with him. We need to set some rules and standards for operations like this. For him, it comes down to the fact that there may be a higher and better use of the land in this area. Eventually, there will be more homes there.

Washington said she will oppose the motion, though not easily. She is a conservationist and cares desperately about water quality. She still has concerns about runoff and consumption. There are not rules in place to manage large-scale operations in this county. Though she will vote in opposition, she asks that the door not be closed on this topic. Agriculture is changing and she is impressed by the voluntary nature of LPP's efforts to have NDEQ monitoring of the site. She is concerned that is still not enough.

Edgerton agreed with what has been said by her fellow Commissioners. She will also oppose the motion. There is a lot of consternation that comes from lack of understanding. This has been a quick education on these topics, much of it in the last few days. This is cutting edge and she is not sure if Commissioners have everything they need to be completely educated. She believes both sides are acting in good faith. This very likely is a good use for the land, but there should have been more attempts made to provide education to the neighbors. She appreciates any information regarding commercial farming practices and developing zoning regulations in response to that. It is possible that our local ordinances have not kept up with the technology.

Joy said there is a lot at stake. She will vote to approve the motion. She appreciates the time people spent sharing how the land is used, seeing how regulations are done, and the effort by the company to put this together and be publically responsible. She is supportive of seeing regulations adopted and to see what positive things may occur in our county.

Finnegan thanked everyone for the civil discussion. She came into this meeting knowing that Planning Commission is a land-use agency. This is the right use for the land. She heard what was said with her heart. She hopes to see Mr. Essink succeed.

Corr said there have been valuable things said today. She would also like to see the County strengthen regulations to alleviate some of the issues that came up today. A similar operation has been approved and it speaks volumes that there have been no complaints. At this point, all of the rules have been met so she will support the motion.

Motion fails to carry due to a lack of receiving five affirmative votes: Beckius, Corr, Finnegan, and Joy voting 'yes'; Edgerton, Hove, and Washington voting 'no'.

David Cary, Director of the Planning Department, stated that due to a lack of a fifth vote in either direction, this item will automatically carry over to the regular Planning Commission hearing of August 1, 2018. Public Hearing should be kept open for new information only and no new legal advertisement is necessary.

Corr reiterated the next Public Hearing will be for new information only.

There being no further business to come before the Commission, the meeting was adjourned at 8:32 p.m.

Note: These minutes will not be formally approved by the Planning Commission until their next regular meeting on Wednesday, August 1, 2018.

PLANNING - SP18025 - ATTACHMENT #1

Impact of Livestock Expansion on Property Values Lancaster County, NE July 2018

Many studies have been completed by Universities, realtor association and other stake holders on the effect confined livestock operations have on property values for neighboring homes. The consensus is... there is no consensus. Different projects have different impacts and the impact to neighboring property values can decrease, but they can also increase too.¹ Today's livestock and poultry buildings are more environmentally responsible than ever before. Farmers and ranchers employ the best available technologies for dealing with both waste and odor. These things help ensure a better quality of life for rural Nebraska, and for generations to come.

With this in mind, we have completed some of our own research surrounding valuations of properties near existing livestock operations in the area. In particular, we have detailed our findings related to the most similar site in the area, a 5 barn egg laying farm on the Lancaster/Gage County Line Southeast of Firth.

Property Value Research Lancaster County

- Based on Lancaster and Gage County Assessor GIS data
- Evaluating the assessed value of "improvements" on each of these parcels.
 - Improvements may incorporate more than just a home, but Lancaster and Gage County separate improvements from outbuildings and so evaluating the assessed value of improvements in both of these counties generally reflects only the home on the site.

Conclusions

- People have felt so comfortable there are several instances of new construction.
- Generally positive growth in property values no matter the size or location of a home to a livestock facility.
- Any decrease seems likely related to the age and quality of the home.
- Difference in percentage valuation increases between Lancaster and Gage county is likely due to county assessor discretion.

¹ Edwards, Seanicaa; Massey, Ray, "Animal Feeding Operations and Residential Value: Summary of Literature." University of Missouri Extension, MP748, Revised October 2011 (2011).

5 barn egg laying facility on Lancaster/Gage County Line

5 barns constructed from 2001 to 2005. There are 25+/- homes within 1 mile of this facility, and an additional 20+/- within 1.5 miles. Many homes in this area are similar "mini acreage" type properties comparable to those near the Denton Road site proposed by Randy Essink. There have been multiple built within 1 mile of this facility since 2010.

Manure handling practices are very similar to the proposed Randy Essink project. Manure from the layer houses is stored in the layer house until it is sold to a commercial applicator and loaded onto truck-mounted manure spreaders for transport to land application sites to be applied at agronomic rates following an approved nutrient management plan by NDEQ.

Lancaster County Homes

28550 Fonda Road, 1 Mile Northwest: Up 26% in valuation since 2010 to \$240,000
28551 Fonda Road, 1 Mile Northwest: Up 25% in valuation since 2010 to \$284,000
28751 Fonda Road, 1 Mile Northwest: Up 27% in valuation since 2010 to \$274,100
29151 Golden Pond Road, .60 Miles Northwest, Up 29% in valuation since 2010 to \$274,100
29400 S 120 St, 1 mile East/Northeast, Up 25% in valuation since 2014 to \$295,300
29200 S 120 St, 1 mile Northeast, Up 35% in valuation since 2014 to \$225,100
28800 S 120 St, 1.25 mile Northeast, Down 35% in valuation since 2014 to \$76,900 (1000 Square Foot, unimproved home built in 1960)
6041 Village Dr. 1.25 mile Northeast, Up 28% in valuation since 2014 to \$88,300
11801 Firth Rd, 1.25 mile Northeast, Up 15% in valuation since 2014 to \$247,000.

Gage County Homes

10702 E Apple Rd, 1 mile South, No increase or decrease since 2013. Valuation of \$66,690 (1 story home built in 1900)
11402 E Apple Rd, 1 mile South, No increase or decrease since 2013. Valuation of \$64,000 (1 story home, unimproved, built in 1979)
680 S 120th St, 1.25 mile East, Up 13% in valuation since 2013 to \$229,030
12455 E Gage, 1.25 mile East, Up 6% in valuation since 2013 to \$240,165
12511 E Gage Rd, 1.25 mile East, Up 9% in valuation since 2013 to \$237,535

Man *with a* plan

Walt Shafer, a longtime Pilgrim's Pride executive and broiler grower, is leading construction and operation of Costco's Lincoln Premium Poultry — possibly the world's most technologically advanced chicken processing plant and a new standard of business for the industry.

by Tom Johnston, managing editor

A brutal winter has made for a slow thaw in the Great Plains, but at long last the seasons are changing. In Fremont, Neb., the landscape is, too.

The sky-high feed mill looming over the open fields signals a shift in a state where beef dominates; it will support a \$400 million chicken complex that Costco Wholesale Corp. is building in order to control the quality of birds it sells in its depots nationwide.

The effort spawned a new company, Lincoln Premium Poultry, which will process those chickens in a 360,000-square-foot facility that promises to be among the most technologically advanced in the world and will employ 1,000 people.

To supply the giant facility, grain farmers are converting to poultry growers, building on their plots at least four chicken houses each, with some as many as 16. Each one of the total 432 barns houses 42,000 birds, making for a one-time capacity of more than 18 million of them.

Overseeing this whole new ecosystem in Nebraska is Walt Shafer, a Virginia broiler grower for Pilgrim's Pride who also spent his career working sales and operations for the large integrator. In the twilight of that tenure, he jumped at the opportunity to join Lincoln Premium as its chief operating officer and put his "thumbprint" on a project he believes will advance the entire industry.

With the security of running a business whose product is already sold out to its only customer, Shafer and his team can focus on

News of Costco's proposed chicken plant broke in April 2016: meatm.ag/costco-news

Photos by Geoff Johnson

THOUGHT *leader*

executing new farm contracts and highly automated plant operations that primarily will address animal welfare concerns and increasingly vexing labor issues.

About at the midpoint of the big project, Shafer took time to chat with *Meatingplace* about how the Costco-Lincoln Premium Poultry partnership will work to bring a fresh perspective to the business of putting chicken on plates.

Meatingplace: What was the strategy behind making such a huge investment, particularly when supply is so plentiful?

SHAHER: Costco's strategy is really looking out over the next 20-plus years. [What they told me was,] 'We need to know how to feed the world in the future and where our supply is going to come from.' [With] their specifications [on] quality, their attention to animal welfare ... they decided that they would start with [Lincoln Premium Poultry] here in Nebraska.

Meatingplace: How did Lincoln Premium Poultry come about?

SHAHER: Lincoln Premium Poultry is

a Nebraska company ... created to manage and operate this complex on Costco's behalf. The name Lincoln actually comes from the capital of Nebraska.

Our role in this is to essentially spec it out, select the equipment, recruit the growers, design the grower houses, implement this process and then manage and operate it over the long period of time for Costco. ... They're our owner, and also our customer. It's a unique relationship.

We're not here every day spending time worrying about chicken markets in the future. We're not worrying about competing. We're not worrying about where our product will go once we're up and running. That's already set. We're really focused on the execution of the project.

Meatingplace: And where is the project as we stand today?

SHAHER: If you go to Fremont today, on our 412-acre site you'd see a feed mill that has already been poured. It doesn't have equipment in it yet. As soon as the weather breaks, we'll start moving forward on pouring the storage bins, et cetera. The processing plant has walls starting, al-

ready up and continuing to move forward.

We have had an extreme winter out here, [s]o I would say we've lost a few months on the construction timeline on our original project. Originally, we were targeted to open and start ramping up in June of 2019. I think it's going to be more like September of 2019.

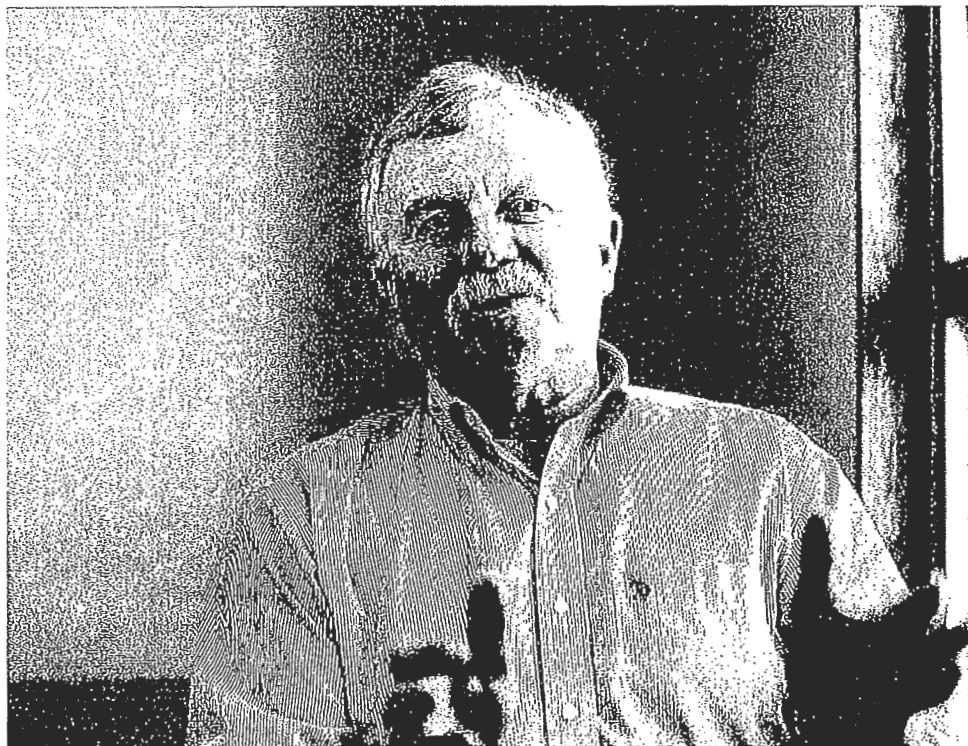
[Then we] have a 45-week ramp-up process. That ramp-up process is tied to the construction of all of our poultry housing ... so that our growers mitigate interest and we can start putting poultry into their houses as we ramp up. And then we phase in all the hiring, recruitment of the employee base in that same ramp-up schedule.

Meatingplace: What was the rationale behind locating Lincoln Premium in Nebraska?

SHAHER: Costco ... sent a team out to several states looking where to put one of these facilities. One requirement was, where's the corn? And we certainly sit right in the middle of the Corn Belt. Another requirement was that we had to have farmers who were willing to grow for us, and we found overwhelming support. These grain farmers out here want to diversify. The third requirement was labor. Our labor's tied up everywhere in the country, but we've identified areas in and around our location where there's unemployed or underemployed labor that we think we'll be able to attract and bring into our facility. Lastly, [we need] water and water resources, and we're sitting on the largest aquifer in this country.

Meatingplace: What has it been like to convince grain farmers to become chicken growers?

SHAHER: Our typical farmer may have 1,000-plus acres of cropland that they're producing corn or soybeans on. Our typical farmer may have three generations of the family living on that farm.



THOUGHT leader

We are in a unique situation. No. 1 is, the corn markets haven't been that favorable to the Nebraska farmers here for the last three, four years and they're seeing the need to diversify their income stream. Poultry gives them the ability to do that. Secondly, the value of the chicken litter; these farmers are using an enormous amount of commercial fertilizer today to fertilize this crop ground, and what they've seen is the ability to get a hold of chicken litter to substitute. That carries an organic value, and it carries a good value on the commercial fertilizer replacement, not to speak of the potential yield gain that they'll get on the crops.

And then the last piece, and it's the most compelling piece, is ... when we're going through the pro forma and talking to [farmers], inevitably one of them will say, 'You know what this does for us? We've got a couple of kids that work full-time on the farm, and we've got a third one ...' that may be working in a factory or in another state. And they'd really like for that child to come back to the family farm, but the current farm won't support him. 'But with this poultry contract that we're going to get and employ, we'll be able to bring the [other] child home.' It's just a good story to tell.

Meatingplace: The contracts that some growers have with big chicken processors are often maligned as being unfair to the farmers. What's different about your contracts?

SHAFER: Our contract, we think, has one of the best pay rates in the industry. And it has to. We have no farms that have one, two or three houses. All of our farms have four-plus houses. So we're asking our growers to make an investment of millions of dollars. The contract is a 15-year contract with these growers.

Meatingplace: Is that longer than typical?

SHAFER: Yes, I think so. I think the



This was an opportunity for me personally to put my thumbprint on something that was new and unique... to do something that I think will change the way we look at business.

industry is moving that way. I think the industry sees a need to add more ink to the contracts to satisfy the grower and the bankers. ... So, essentially, our pro forma says, 'With all the inputs you're going to supply and the inputs that we'll supply, in 15 years, you'll make a comfortable living and your debt will be paid off.'

[The industry's standard] contract, you know, it's been referred to — and I don't like this term — as the tournament system. I'm a grower for an integrator (Pilgrim's Pride), and I'm okay with that process because I tend to do well, to manage well, and I'm rewarded for my efforts. But ... these are all brand-new growers. They've never done this before. They're relying on us to lead and show them the way, and I think a show of good faith on our end is, in our contract, we will not penalize you for poor performance. Essentially, we don't take away, but we will reward you for positive performance. They'll know exactly what their income stream will be, plus the potential to even do more than that.

Meatingplace: What do you mean by "plus the potential to do even more"?

SHAFER: If you take a typical industry contract and you settle, some of the growers are going to settle below the average cost, and some will settle above the average cost. What we're saying is, if you settle below, we're not taking anything away. If you settle above, we'll continue to pay you. So, we essentially say there are no negatives on poor performance, but we'll reward you if you're better than the average.

And this is really not us against the industry. This is just what we're doing for Costco and what we're doing for the Nebraska farmers.

Meatingplace: So how did this project come about, and how did you personally get involved?

SHAFER: I have a partner in the project.

THOUGHT *leader*

His name is Bill Crider. Bill's family business, Crider Foods, has done business with Costco for 20-plus years. They supply the canned chicken. It was the relationship that existed ... and a discussion came up on, what if we did this?

Bill and I met on a few business dealings over the past few years, and he knew of me in the industry. He made a convincing argument, eventually, for me to join him in this project.

Meatingplace: You had a successful career [at Pilgrim's]. What was the convincing part of Crider's argument to get you to jump?

SHAFFER: I look at my career as ... I don't have as long as I've been through. Let's put it that way. And I've had a great career. The poultry industry [and] Pilgrim's treated me well. It was a difficult decision to leave.

But the compelling argument ... was that this was an opportunity for me personally to put my thumbprint on something that was new and unique. Costco has given me the opportunity to kind of design this the way I would like to do it, to put an innovative contract in front of growers, and really

to do something that I think will change the way we look at business. It's a great way to wrap up one's career.

Meatingplace: It isn't often that a person gets this opportunity, and it's not often that a plant of this size is built. What is the philosophy behind how you want this plant to run and what you think it means to change the way the industry does business?

SHAFFER: Well, I think the industry's changing anyway. It's just a matter of how quickly.

I'll use a couple of examples. Labor is becoming more and more of an issue. It's finding, attracting, retaining, keeping labor safe, convincing labor to come to work for you and really spend a career with you. What this opportunity allowed me to do was really to put in a lot of technology that I think takes out a lot of the difficult jobs. It put us where our average employee's going to have to be more technologically advanced. Let's face it, there are a lot of jobs in our industry today that are tough to get people to do. And what Costco and Lincoln Premium have embraced here is [identi-

fying] those jobs that we can replace with technology that improves the process, improves the safety, and improves the possibility that our employees will stay with us over a long period of time.

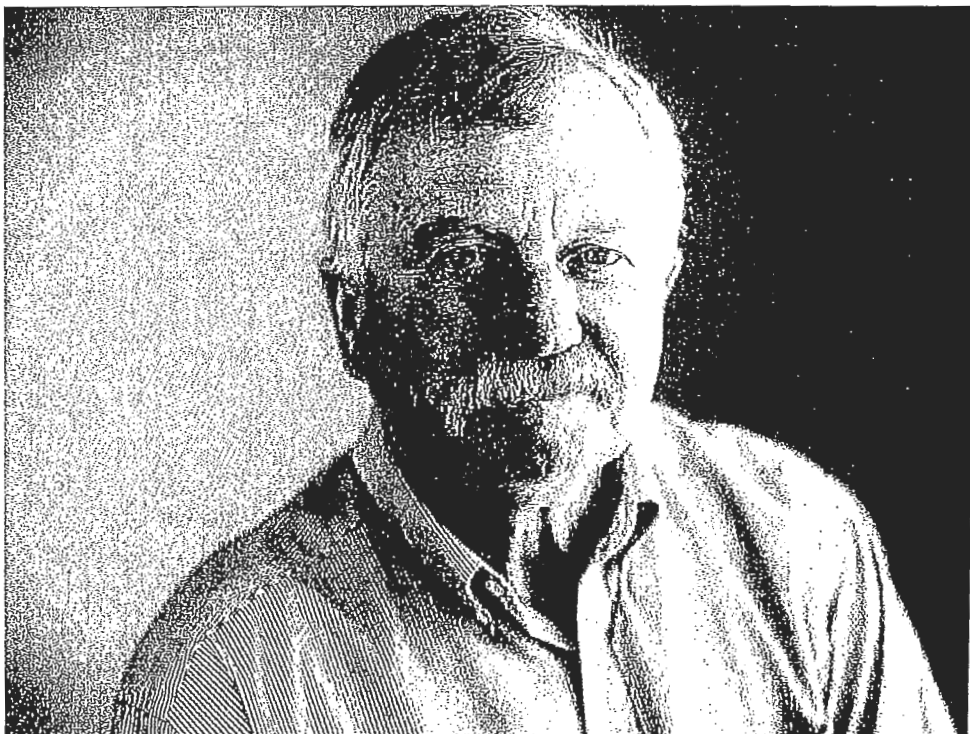
[The other] caveat [is] what makes sense from an animal welfare standpoint, that the product we bring in is going to be handled in the best and most humane way it can be. We put the technology in place that does that.

Meatingplace: Can you illuminate on what types of technology you will be using?

SHAFFER: We will be putting in automatic chicken catching. We're going to go with a drawer system in this process on live bird handling. Picture this — it's like a dresser [on wheels that has drawers]. You set a module in a chicken house and — [whereas] the industry uses what we call cages where you have to open a door and put the chickens in — we slide the drawer out and put the chickens in. And we think that is going to be a lot better for the handling and the welfare of that bird. I'm not aware that any of this particular drawer set is being used in the U.S. The company that we're working with, which is Marel, is developing this drawer. We're the first ones to go with it.

We're in Nebraska. It's cold out here. Our transport trucks will all have tops on them. They'll have curtains that will go around the trailer itself. That curtain will protect our birds being transported down the highway. Another thing it does is there's no potential for feathers or dust. And thirdly, you're not going to see poultry transported down the highway; that offends some people. We saw this as we did all our due diligence in Europe. Canada uses it a lot. It makes sense for the poultry. It makes sense for our public perception on handling poultry.

Our processing plant will have what



THOUGHT *leader*

we call a lairage system. All of our trucks, when they come in, they will pull inside of our processing plant. We have a robotic system in there that will take these modules that the birds are in. I have the capacity to hold 12 tractor-trailer loads inside. We're able to cool these birds when it's warm inside. We're able to warm them up if it's cold outside. It's like a big bird storage warehouse, inside the building.

All of our modules will be cleaned and sanitized after every time they're used. Those trucks and trailers will be cleaned and sanitized, all taking place inside the plant on every trip [for] disease control.

We're gas-stunning these birds. All of our lines are essentially the latest tech-

nology from kill, pick, all the way through evisceration with such things as automatic giblet harvesting, et cetera.

Our facility also will be air-chilled.

Meatingplace: What are the advantages of air-chilling?

SHAFFER: Well, one advantage of air-chill is that the process is automatic. When our birds come through kill, pick, they're automatically transferred to evisceration. And when they come from evisceration, they're automatically transferred to air-chill. And when the air-chill comes into our second process and the sizing distribution cut-up line, it's automatically transferred. So, that replaces a lot of manual labor. From a traceability

standpoint, it gives us a lot better opportunity to actually trace birds more on a bird basis than on a flock or a house basis.

Costco feels [air-chilled product] potentially could be a better product that their members would like. They have experience with these types of products [in other countries] where they do business, and they wanted to try it here in the U.S.

Meatingplace: What about air-chilling might make it a better product?

SHAFFER: The process itself that we're using is new and unique. It's called maturation. We feel that it's going to tenderize that product better. The air-chilling process itself is almost three hours. We use various degrees of temperature in

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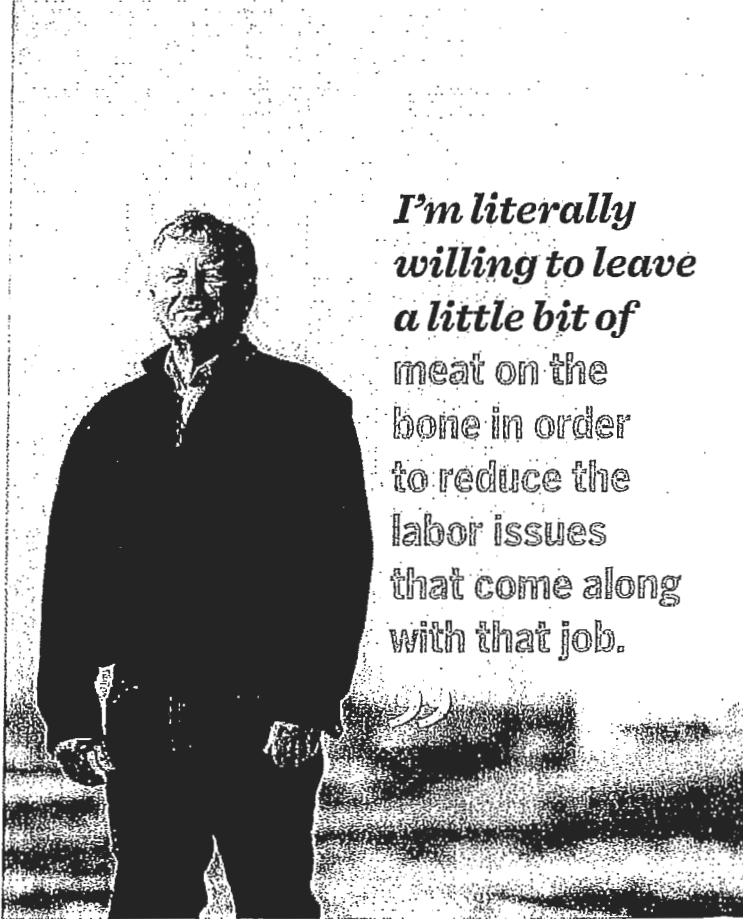
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*I'm literally
willing to leave
a little bit of
meat on the
bone in order
to reduce the
labor issues
that come along
with that job.*

THOUGHT leader

that process. The other thing is we don't anticipate we'll have as much moisture in the pack.

A featured item of Costco warehouses and really what the members enjoy is the rotisserie deli WOGs (whole chickens without giblets). Another cornerstone of their thought process is the belief that that air-chilled bird on that deli spit is just going to have a lot better product attributes.

Meatingplace: What else is in the product mix?

SHAFFER: We're going to process 2 million birds a week. Mathematically, about 800,000 of these birds will be rotisserie deli WOG. And the reason for that is that's the size and grade criteria that we think will follow that product mix. The other 1.2 million will be boned, and we'll put into the Costco products that they sell in their warehouse — we call them saddle pack. Those are the pouch pack products ... the boneless breasts, the boneless thighs, the bone-in thighs, drumsticks, wings, tenders.

Meatingplace: As you're going through and you're taking pains to handle the birds humanely and create the best product possible, what are the macro trends, particularly with

what consumers are looking for, that you think your company will be taking advantage of?

SHAFFER: I think Costco's members want to know where their product is coming from. They want to know that that product was treated in a humane way. They want to know that we have farmers that are earning a good income to produce that product for them.

But one thing that's key with this process is our bird weight here is going to be a 6- to 6¾-pound bird. The industry has been trending up on bird weights. This bird here is specific for our needs with Costco, because that essentially hits right in the heart of those rotisserie deli WOGs that their members expect. Our business plan is developed right around that bird size. Costco is looking to ensure that they have that bird size for the long term.

Meatingplace: Some birds in the industry are getting up to 9 pounds. Isn't that more efficient?

SHAFFER: I'd make the argument it is more efficient. But if your member doesn't want that, you're going to put together a business model that gives them what they want.

... [E]ven on our [housing] densities,

we're actually giving them more room than the industry average, because again, Costco's philosophy is we want to be better than the rest on what we're doing with our product, our people and our processes.

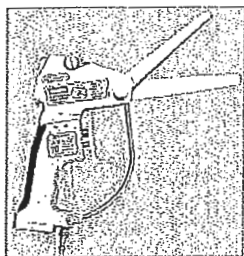
Meatingplace: The fact that Costco is entering the chicken business is a reflection in itself of how well the chicken industry has been doing. Why do you think the industry has been doing so well, and why is it the right time for Costco?

SHAFFER: The industry over the last several years has gotten more disciplined in its growth. I think the industry certainly doesn't just go out and produce pounds to produce pounds. They have a strategy and a vision in mind of what they want to do.

And you know, I can't speak for the industry, but I'll just tell you that a lot of the assets in the industry are getting old.... I think some of this new construction is more efficient, just like us. And the industry is moving along that way.

I think the industry is deboning a lot more product than they ever have, meaning that when you look at pounds being sold, a lot of it's more boneless pounds. And you don't eat the bone, but it's reported as pounds. So, you know, the industry will

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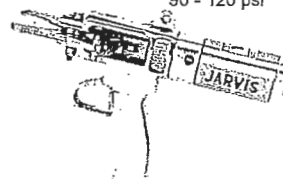
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continue to grow. I think the industry's going to feed the world.

Meatingplace: Where will your workforce come from? How many people? What kind of skills? Why do you think they'll want to work there?

SHAFFER: Projected employment is somewhere between 800 and 1,000 employees for our complex. The typical complex's size would probably have 1,400 or 1,500. So, you can kind of get a feel for how automation really [has an impact].

Our studies say the labor is here in the area. We don't have any preconceived ideas that we put an ad in the paper and everybody will come in. But we're going to have an attractive wage [and] a great benefits package. And again, I go back to Costco and what they require of us. Our employee welfare facilities are going to be fantastic. I would like to think that, you know, we've become a place where you want to come to work.

We'll still need people that have hands, but you know our skillsets have just moved up the ladder a great deal. For example, we have automatic deboning in this facility. That's typically done in this industry by hand. We'll never get as good with a robot as we do with a person with hands, but hands get injured. Hands have to come to work. Hands have to go through a routine every day. And what we've said is we'll automate that process, and then we will get, retain and train the best people to maintain and operate it. ... I'm literally willing to leave a little bit of meat on the bone in order to reduce the labor issues that come along with that job.

Meatingplace: Is there anything else you want to mention about the technologies you might be excited about?

SHAFFER: We're using vision technology to essentially take 3D pictures of these birds as they go by, where we can

then distribute them by weight and by grade. This facility also has automatic thigh deboning in it. It actually has robots that pick up the boneless breast meat, thigh meat, drumsticks — all the Costco products — and puts them in the package, again eliminating labor.

We're using what's called a VRT system to refrigerate and chill this product. VRT systems are used in this country primarily to freeze product. What we're going to do is chill the product, and then we tie it in with a palletization system. That way we can actually pick orders out of it and palletize automatically from the system itself, again eliminating the need to go into storage, eliminating the need for people "to stack off," et cetera.

Meatingplace: Give us an idea of how these machines are going to be working with each other, how the information they produce is going to be used by management and what particular advantages you will see from that.

[Costco is] our owner, and they're also our customer.

It's a unique relationship. We're not worrying about we're our product will go."

29



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SHAHER: Marel is furnishing this call to NOVA, which is the operating system. It essentially operates the entire plant floor. And yes, part of our process will be to get everything to talk to each other, and NOVA has that technology. We have to figure out the wiring diagrams and so forth to get it done. But we'll have an immense amount of data coming from the floor, and I'm the type [who says] that's great, but first of all we've got to ask ourselves, 'What data do we want to see? What data really makes a difference to us? How do we want to handle that?'

I think that after we start and then a couple of years from now, that'll be different. But we'll have the ability to look in on every machine to see how it's performing — up time, down time, mechanical expense, yields, quality ... — on a real-time basis.

On the grow-out end, we're using MTech technology. [W]e're putting all our feed bins on electronic weigh cells out at the grow-out houses. Our grow-out houses will have the MTech scaling technology where the broilers walk across it. I'll be able to look on the computer and tell you exactly, on a real-time basis, what the feed conversion is running on every house at any given time. And it'll tell you exactly what the weight is.

Long-term we'll be able to then look across the enterprise and look at attributes, if it's making a particular grower or a particular house perform better or worse than the others, and be able to analyze the variables and make better decisions. Maybe Grower A is getting better performance in the enterprise, and we can look across the data and see that maybe it's an aspect of water consumption, maybe temperature — any given variable. We'll be able to look at that and make decisions.

Meatingplace: When all is said and done, would you put this up with the best plants in the world?

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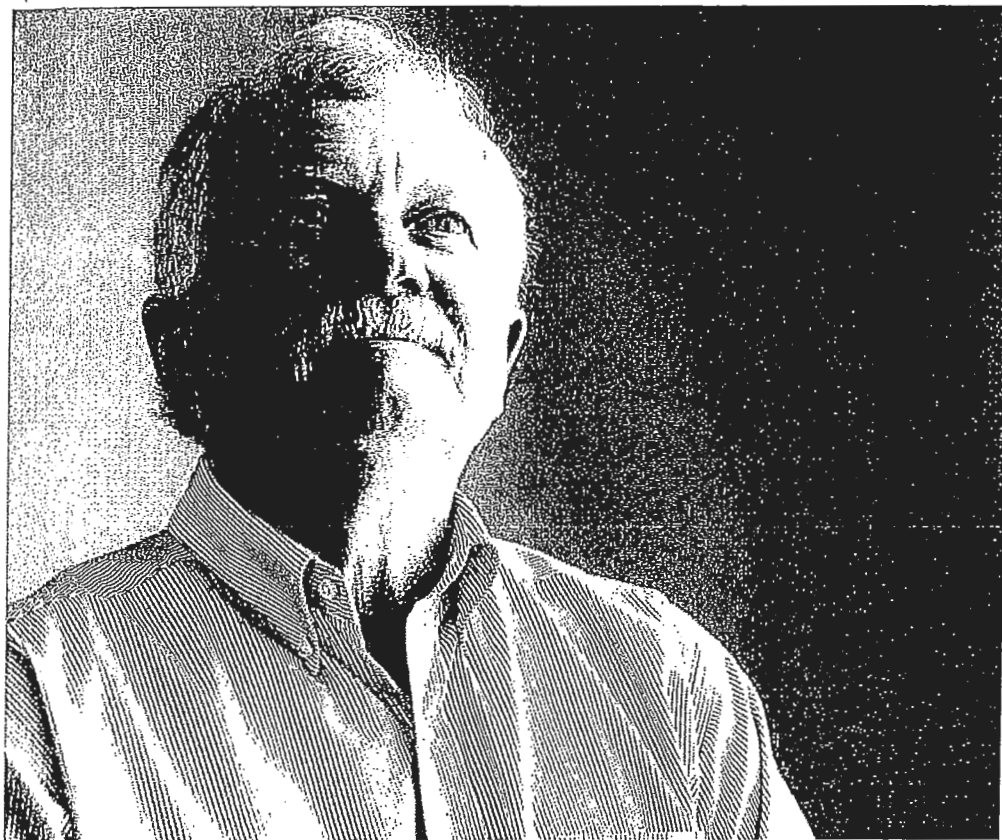
*We'll still
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SHAHER: Certainly. I got to smiling here. ... [W]e've got a corridor or a hallway that starts from one end of our process and goes completely to the other end, where you can walk down a hallway, look through plate glass windows and be able to see our plant from one end to the other. And the other thing it does is our employees can walk to all their job centers without having to walk through the middle of the plant. Literally, our people that work back in live receiving can walk down a hallway and never have to go outside or inside and get to their work areas. We're as proud of that as about anything we've done in this plant.

Meatingplace: That's a comment on transparency as well, right?

SHAHER: Well, it is. Going through the approval process here in the community, one of the things we said is — it's kind of a Costco motto and we've adopted it — we're going to do the right thing, from the way we treat our growers and our community to the way we conduct ourselves. There were some here that didn't want us here. There were some that were skeptical. But overwhelmingly the community at large said, 'You know what? We trust you. It's a great company to have here. We want you here.'



And we in return said, 'You know what? We're always going to...let you know what we're doing and how we're doing it.'

And we just felt this viewing corridor was probably a great way to show we're doing exactly what we said, and we have nothing to hide. You can bring in a class of kids from maybe the grade school, and they can come through your facility and say, 'One of these days, I may want to work here.'

Meatingplace: How would you describe your relationship with your technology and equipment supplier, Marel?

SHAFER: Personally, I've done business with Marel probably going on 30 years. I've had a relationship with these people through their growth, and I know a lot of them personally. I've been to their facilities all across the world. They've asked for my advice on technology that they've developed. They're proactive and innovative.

As a matter of fact, [while on] our trip to [visit] them in Europe, we said, 'Why don't we become your European plant in the U.S.?' Meaning, why do you need to take U.S. customers to Europe to see ev-

everything you're doing?' So, we're putting an office in for these folks. They'll have a presence at our facility.

And we've opened up the door for them to bring U.S. customers, and that means the poultry industry, to come and see what they've done here. Again, I'm not competing with the industry. My customer is Costco.

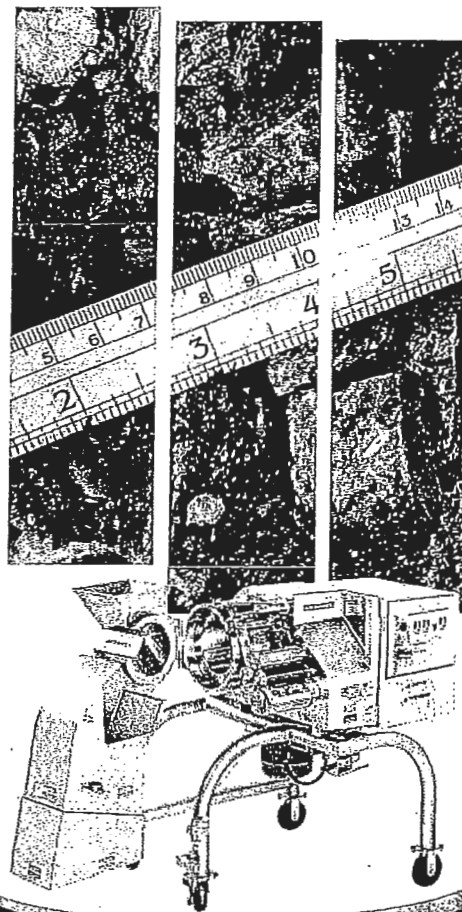
Anything we're doing that can benefit the industry, we'd be glad to do it. And anything we can do with Stork and Marel to improve technology here in the U.S., we certainly want to partner with them.

Meatingplace: So, you can become an educational center, not only to the public but also to the industry?

SHAFER: I'll give you an example of that on another deal. ... [P]art of our agreement with [a contractor] is they're going to build a chicken house for us on our complex site. And this chicken house is not to grow chickens. The chicken house will have a classroom in it [with] the various types of equipment from a broiler, breeder and pullet farm. We can bring people in and do a tour and demonstrate technology. We're going to continue to educate, demonstrate and train.

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THOUGHT *leader*

Meatingplace: What has been the total investment in this project? How much of that is dedicated to the processing plant, specifically?

SHAFFER: Our total investment from Costco, when it's all said and done, is going to be somewhere around \$400 million. That's the complex figure. I'm going to ballpark the plant and say it's about \$300 million of the \$400 million.

Meatingplace: And this is sort of a new model for Costco. Is this something that we're going to see in more parts of the country from Costco in the future?

SHAFFER: I can't speak for them on that. I would like to hope that we're successful and we show them this is a business model

that did everything that they expected it to do. And my thoughts are, if it is, then they certainly would probably consider it. It's quite an investment on their part, and it's quite a position for them to take. But I like to remind everybody, we need to be successful and get this one done right before we plan on anything else.

Meatingplace: I wouldn't imagine you've had this type of undertaking before, even in a career as long as yours.

SHAFFER: We're adding key managers essentially about every month as we go forward, so what I've done is stacked the deck here. We've got most of the live management team here. This grower piece is integral. We have to train the growers

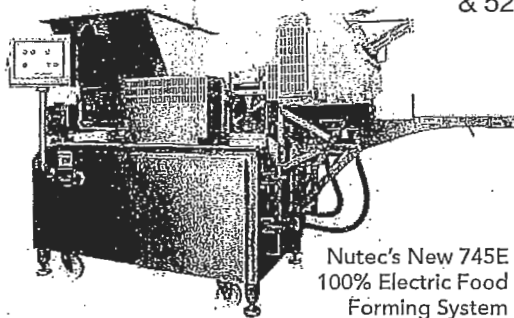
before the growers ever grow birds. And we partner with the University of Auburn, and we're working with the University of Nebraska here. We've already had a couple of training sessions for farmers on how to ventilate chicken house. Yet, they haven't even started construction on a chicken house. So we're trying to be proactive and have a good presence of our live team out there in front to let them know that we've got the expert piece here [and] will be here with them once these houses are up and running.

Meatingplace: It's a big network. It's a whole new ecosystem there in Nebraska.

SHAFFER: Well, we've tried to tie all the pieces together.

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Nuisance Myths and Poultry Farming

Dr. Dan L. Cunningham
Department of Poultry Science

Introduction

Poultry production is the number one agricultural enterprise in Georgia, accounting for approximately 50 percent of the value of farm products produced. Modern poultry farming originated in north Georgia in the late 1940s and early 1950s, and has continued to grow and expand as consumer demand for poultry products has increased. To meet the demands for more poultry products, producers and poultry companies across Georgia have expanded their operations by building more production and processing facilities. At the same time, the state has experienced increased urbanization and loss of agricultural lands in many of its rural counties. As cities have become more crowded and expensive to live in, many people have moved to the country to satisfy their desire for a more serene lifestyle of "country living."

Unfortunately, many of these individuals understand very little about commercial farming practices. They often tend to be intolerant of typical farming practices that occasionally produce dust, odors and insect pests as part of a normal farming enterprise. This unfortunate set of circumstances is leading to increased conflict between farmers and citizens who have had little prior exposure to agricultural operations. In some cases, poultry farmers are finding it difficult to operate or expand their operations with new production facilities.

As poultry farming has increased in Georgia, there has been a trend toward developing zoning regulations in many counties to manage these issues and provide a viable working environment and pleasant atmosphere

for everyone. A prudent, fact-based zoning ordinance benefits all citizens. A carefully planned and devised zoning ordinance means continued success of the family-owned farm, which provides a stable, consistent tax base for the community, while simultaneously providing protection for all the citizens. Those responsible for implementing zoning regulations want to be certain that their actions are supported by facts. Conversely, a poorly designed zoning ordinance can result in unfair treatment of some members of the community and can negatively impact the economy of that community. Zoning ordinances not based on facts may lead to unnecessary community conflict and litigation.

Many times, people opposed to poultry farming promote excessively restrictive ordinances. Their purpose is to prevent or make it exceedingly difficult to expand or build new poultry production facilities based on negative perceptions of this agricultural business. Often these negative perceptions are due to a lack of accurate knowledge of modern farming practices and/or a general intolerance of any inconveniences that might be caused by commercial livestock production.

In some cases, individuals will deliberately distort the facts by using information out of context that they feel will advance their cause. Many of the contentious debates related to the development of zoning ordinances have revolved around three common myths. These three poultry farming myths are emotionally charged and are usually presented in the most negative manner to sway undecided individuals in the community. These often used myths are listed and discussed below:

Myth # 1

Poultry farms will ruin the environment.

Opponents of poultry farming will often use this argument and contend that environmental pollution is a major problem associated with poultry farming. This is not only a distortion of the facts but is a serious misrepresentation of the truth. Poultry farms do produce manure nutrients as by-products of growing birds. These manure nutrients have the potential, like any fertilizer material, to cause water pollution problems if improperly handled.

In reality, these manure nutrients have substantial value as organic fertilizer and are most often applied to fields as a replacement for commercial fertilizers. Poultry litter has been applied to fields in Georgia for this purpose for more than 50 years with no evidence that this practice causes any significant water pollution problems. In fact, the growth of the poultry industry in north Georgia and the associated proper application of poultry manure to the soil are considered primary reasons for the reclamation of once seriously depleted soils in this area. Poultry litter, in addition to containing plant nutrients, returns organic matter to the soil, increasing its productivity and drought resistance.

There are some legitimate concerns about the potential of nitrogen and phosphorous nutrients from poultry litter to contaminate surface or ground waters if too much is applied. Because of these concerns, poultry growers are implementing nutrient management plans (NMPs) across Georgia to protect water quality. NMPs are site specific plans to help poultry producers manage litter generated from their operations to take maximum value of the fertilizer component while simultaneously protecting the environment. The NMP program being used by poultry farmers has been developed by the University of Georgia and approved by the Georgia Environmental Protection Division (EPD). This NMP program is considered a proactive and effective tool to ensure the continued protection of the state's environment. In some cases, large poultry farms are required to operate under a permit from the EPD in addition to implementing NMPs as part of the state's Confined Animal Feeding Operation Rule (CAFO). Georgia's EPD also has the authority and responsibility to intercede and regulate any farm in Georgia causing an environmental problem.

A properly managed poultry farm will not pollute or cause environmental problems for neighbors or the community and, in fact, it can be very beneficial in providing a valuable fertilizer source for land owners.

Myth # 2:

Poultry Farms Smell.

Uninformed individuals often think that poultry farms will smell so badly, no one can live near them. This is incorrect. The vast majority of poultry farms are family operated and, in many cases, the operators and their families live next to, or in close proximity to, the production houses.

Properly operated poultry houses emit minimal odor. This is due to advancements in ventilation and drinking systems for poultry production houses that keep them relatively dry and thus free of any significant odor. In fact, it is not unusual to approach a modern, well managed poultry house without experiencing any or only minimal odors. The drier conditions in the houses also ensures little or no fly production associated with growing chickens. Occasionally, wet conditions can develop in a poultry house as a result of improperly functioning drinking or ventilation systems, but these situations can generally be easily corrected with changes in management. These situations may occur more frequently with breeder and layer farms than with broiler farms because of the extended period of operation with birds in the houses.

It is impossible to operate a livestock farm without having some odor or fly production as a result of normal production practices. Poultry farms, like any other livestock operation, will on occasion have some odor and fly production, but with good management these occurrences are generally short-lived and provide only minor if any inconvenience to neighbors. The odors associated with poultry production primarily occur when the houses are cleaned out and the litter is spread as a fertilizer. Clean-out schedules for operations vary but are usually no more than once or twice a year. In some cases poultry producers will even go several years before removing the litter from the houses.

Stirring and applying litter during removal causes some odor. The odor from litter application is, however, temporary and lasts from only a few hours to a few days depending on weather conditions. Appropriate management practices for applying poultry litter can reduce the occurrence and impact of this minor annoyance but may not totally eliminate it.

Fly problems occurring as a result of a poultry production operations are most often associated with mortality disposal. These problems can generally be managed with attention to proper operation and maintenance of the mortality disposal systems used. Dead bird disposal is a process permitted by the Georgia Department of Agriculture, and growers are regularly inspected and required to operate these systems properly to maintain their permits.

Myth # 3:

The air exhausted from poultry houses will damage property and cause health concerns.

The adoption of the tunnel ventilation system for poultry houses, which places all of the exhaust fans at one end of the house and concentrates the exhausted air, has led to the perception that these fans can cause problems for neighbors. The purpose of the tunnel ventilation system is to bring more fresh air into the house and move it through at a faster rate to cool the birds. These systems have been very successful in reducing the negative effects of hot weather on the growth and mortality of birds. The exhausted air from tunnel ventilation fans, however, only extends about 50 feet from the houses before it is dispersed into the atmosphere. Providing reasonable set-back separations from property lines and dwellings will ensure that operating these ventilation systems will not adversely impact neighbors.

What are reasonable set-back distances for poultry houses? Years of experience in poultry producing counties can provide some help in answering this question. Some of our highest concentrations of poultry farms are located in counties in north Georgia. These same counties have also experienced very significant urbanization over the years. Many of these counties have adopted ordinances requiring set-backs for poultry houses of 200 feet from property lines and 500 feet from dwellings as part of their zoning regulations. These distances, in most cases, have provided more than reasonable protection for all parties involved while allowing small farmers the opportunity to operate poultry farms successfully. In addition to set-back measures, poultry farms can also use vegetative buffers and diversion fences near the exhaust fans to reduce air and dust movement when deemed necessary.

The issue of set-backs from property lines and dwellings for poultry houses is an important one. In many cases, opponents of poultry house construction have advocated the need for excessive and unreasonable set-back requirements to severely restrict or totally eliminate building because of the large amount of land needed to comply. For example, requiring a 1,500 foot set-back for construction of a poultry house would require more than 260 acres to site an average size broiler operation. A set-back of 4,000 feet would

require more than 1,600 acres to build houses. In many of Georgia's counties, 1,500 feet would eliminate more than 80 percent of the poultry production operations and could cause concentration of production with the largest, most wealthy landowners. Since air does not move far from the exhaust fans, and most of the odor associated with poultry production does not come from the production house but rather from the occasional application of the litter, 200-foot set-backs from property lines and 500-foot set-backs from dwellings for poultry houses provide reasonable protection for neighbors.

Some will claim that air from poultry houses is the cause of health problems for certain people living in close proximity to a poultry farm. No evidence indicates that poultry farms pose any specific health risk to people in general. Poultry farms have been operated for more than 50 years in Georgia by thousands of farm families. The fact that these families have not experienced any significant health issues attributable to these operations would suggest that poultry farming is no more of a health risk than any other type of farming.

Conclusion

Georgia is the number one poultry producing state in the nation with some 4,000 farms in operation. We have a long history of growing, processing and marketing poultry without causing environmental or nuisance problems. Many communities in Georgia have relied upon the stable, consistent tax base provided by poultry farms to build and support local infrastructure. Farmers depend on their land to make a living and historically have been good stewards of their property. Farming in general is much more beneficial to the environment than almost any aspect of urbanization, so protecting farmers from urban encroachment is important in protecting our environment as well as our food supply.

Farms generally represent "green spaces" that protect the environment and preserve the country atmosphere. Well-managed poultry farms operating with best management practices and within state regulations need not be a source of environmental or nuisance problems for a community. Providing reasonable zoning regulations in a community will allow farmers to participate in a very dynamic and economically beneficial business while also ensuring the ability of neighbors to peacefully coexist.

Learning *for* Life

Bulletin 1299

Reviewed February 2012

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Facts for County Planners: Zoning Issues and Poultry Production

*By Dan L. Cunningham, Ph.D., Extension Poultry Scientist (Retired)
Minor Revisions by Casey Ritz, Ph.D., Extension Poultry Scientist*

Poultry production is the number one agricultural enterprise in Georgia, accounting for approximately 50 percent of the value of farm products produced. Modern poultry farming originated in north Georgia in the late 1940s and has continued to expand across Georgia as consumer demand for poultry products has increased. Georgia ranks number one in poultry production in the United States with more than 4,000 family-owned poultry farms producing more than \$5 billion annually in farm gate value. Georgia poultry farmers are among the best in the world at growing chickens using state-of-the-art technology, housing systems, and best management practices. To protect this vital business for Georgia farmers, it is important that agricultural zoning ordinances be prudently devised and factually based.⁽¹⁾ County planners and decision makers should consider the following facts about poultry farming.

Economic Impact

Poultry farms make significant contributions to the local economy. An average-size poultry farm (four houses) represents more than \$800,000 in housing and equipment investments alone and results in more than \$160,000 annually in gross income,⁽²⁾ most of which supports the local economy. In addition, the average-size poultry farm pays between \$4,000 and \$6,000 in annual local property taxes just for production houses. Thus, a county with 100 poultry houses will have in excess of \$4 million annually in gross farm income just from poultry production, and the owners of these houses will pay in excess of \$100,000 in property taxes each year.

The economic importance of poultry production for Georgia farmers and local communities is well documented. According to a University of Georgia study,⁽³⁾ total farm incomes for counties with poultry production were significantly greater than total farm incomes for counties without poultry. This study also reported that net farm income for poultry counties was almost three times the value of those for non-poultry-producing counties.

Environmental Considerations

Opponents of poultry farming often contend that environmental pollution is a major problem associated with poultry farming. This is not only a distortion of the truth, but is a serious misrepresentation of the facts. A properly managed poultry farm will not pollute or cause environmental problems for its neighbors or the community; in fact, it can provide a valuable natural fertilizer for landowners.

Poultry farms produce manure nutrients as a by-product of growing birds. These nutrients have substantial value as organic fertilizer and are often applied to land in place of commercial fertilizers. These manure nutrients have the potential, like any fertilizer material, to cause water pollution problems if improperly handled. In reality, poultry litter has been applied to Georgia fields for more than 60 years with no evidence of causing any significant water pollution problems. In fact, poultry production and the associated application of poultry litter are considered primary reasons for the reclamation of once seriously depleted soils in north Georgia.

There are some legitimate concerns regarding the appropriate application of poultry litter. As a result, Georgia poultry growers are utilizing nutrient management plans (NMPs) to protect the state's water resources.⁽⁴⁾ The NMP program being used by poultry farmers was developed at the University of Georgia and approved by the Georgia Environmental Protection Division and the Georgia Department of Agriculture. Georgia's EPD has the authority and responsibility to intercede and regulate any farm in the state causing an environmental problem. This, however, has rarely been the case in Georgia.

Air Emissions from Poultry Houses

The adoption of the tunnel ventilation system for poultry houses, which places exhaust fans at one end of the house and concentrates the discharged air, has led to the perception by some people that these fans cause problems for neighbors. Exhausted air from these tunnel fans, however, only results in measurable air movement within about 100 feet from the poultry house. More importantly, research at the University of Georgia⁽⁵⁾ has demonstrated that the ammonia and particulate matter discharged from these houses are dispersed into the atmosphere very quickly after emission. At 100, 200, 300, and 500 feet from the fans, these particles could not be measured in any significant level. In this study, ammonia concentrations were less than one ppm 50 percent, 75 percent, 85 percent, and 90 percent of the time, respectively. After 500 feet, the levels were no different from those observed in normal air samples. In all measurements, the ammonia levels were significantly less than the lowest detectable ammonia threshold level of five ppm. These research-based facts do not support the contention that exhausted air from poultry houses is a source of damage for a neighbor's property or health. This is important information relative to establishing setbacks for poultry house locations and is discussed more fully in Extension Circular 931 "Facts for the County Planners: Set-Backs for Poultry Houses."⁽⁶⁾

Poultry Farms and Odors

Uninformed individuals often think that poultry farms smell so badly that no one can live near them. This is incorrect. The vast majority of poultry farms are family operated and, in most cases, the operators and their families live next to the production houses. Properly operated and managed poultry houses emit minimal odor. This is due to advancements in ventilation and drinking systems that keep poultry houses relatively dry and free of any significant odors. Occasionally, wet conditions can cause an odor to develop, but these situations are usually short-lived and can be corrected with management. (These situations may occur more frequently with breeder and layer operations than with broiler farms because of the extended period of operation with birds in the house.)

It is almost impossible to operate a livestock farm, including a poultry farm, without having some odor resulting from normal production practices. Most of the odors associated with poultry production occur when the houses are cleaned out and the litter is spread as a fertilizer; thus, most odors associated with poultry production have little to do with the location of the houses. Clean-out schedules vary, but usually occur no more than a few times a year.

Litter application practices can reduce odors during spreading, but may not totally eliminate it. Odors produced as a result of poultry production are generally minimal and occasional, and are not sufficient reason to deprive landowners in agricultural areas the opportunity to participate in an important agricultural enterprise. It is important to realize that the long-term viability of a family farm may depend on the owner's ability to diversify income by adding poultry houses. Excessively restrictive zoning regulations can have serious economic consequences for a community and its farmers.

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- ⁽³⁾ *A Comparison of Farm Incomes for Poultry and Non-Poultry Producing Counties in South Georgia*. Dan L. Cunningham, Department of Poultry Science, University of Georgia Extension Circular 897, March, 2006.
- ⁽⁴⁾ *Georgia's Nutrient Management Program for Poultry Producers*. Dan L. Cunningham and Casey W. Ritz, Department of Poultry Science, University of Georgia, www.poultry.uga.edu.
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<http://extension.uga.edu/publications>

Circular 932

Revised October 2015

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Lincoln Premium Poultry Fact Sheet

Who is Lincoln Premium Poultry

- Lincoln Premium Poultry (LPP) is a Nebraska Company created for Costco in collaboration with Costco specifically for this project. Lincoln Premium Poultry's values reflect Costco's values.
- Currently Lincoln Premium Poultry has 12 employees, many who moved to Nebraska to be part of this project.
- Lincoln Premium Poultry will eventually employ approximately 1,000 people throughout their operation

Project Overview

- Costco is investing approximately \$400 Million in a 3-facility poultry facility, which includes a processing facility, feed mill, and hatchery.
- Growers will invest an additional \$300 Million collectively throughout roughly a 60-mile radius – which touches the following counties: Butler, Burt, Colfax, Cuming, Dodge, Madison, Platte, Polk, Saunders, Seward, Stanton, Thurston, Washington, and Wayne
- The project will lower property taxes by adding a minimum of \$63 million to the tax base.
- Overall economic impact of around \$1.2 billion annually, which is about 1% of the State GDP.
- Costco and Lincoln Premium Poultry will become a new business partner in the region

Live Bird Project Overview

- Barns located around the region in 3 or 4-barn sets
 - 24 Pullet Houses (8 farms)
 - 64 Hen Houses (16 farms)
 - 432 Broiler Houses (4-barn, 6-barn, 8-barn, 10-barn, 12-barn)

Contract Highlights

- 15-year contract
- 6 broiler flocks per year guarantee
- Density guarantee
- Base pay guarantee with performance bonus possible
- Pay is not impacted by condemnation at the plant
- Grower may terminate the relationship for any reason so long as 90-day notice is provided
- Company provides chicks, feed, technical expertise, catching and veterinarian services
- 3 pillars of contract include: Animal welfare, nutrient management, biosecurity
- GIPSA-compliant
- Grower improvement program with peer review available to assist growers if performance issues arise
- ADR process (with assistance from peers) to resolve disputes
- No arbitration clause

Water Use in Barns

4-barn set broiler farm:

- 2 80-gallon per minute wells – one for use and one as a back-up
- Baby chicks utilize around 1 gallon/minute for drinking
- At full weight, birds utilize around 12 gallon/minute for drinking
- Average water usage for consumption is 4.63 gallons/minute throughout the flock cycle
- Additional water is used for evaporative cooling technology in warmer months, which brings the average total to 7.5 gallons/minute

4-barn set breeder farm:

- 2 60-gallon per minute wells – one for use and one as a back-up
- Average water usage for consumption is 3.5 gallons/minute throughout the flock cycle
- Additional water is used for evaporative cooling technology in warmer months, which brings the average total to 7.5 gallons/minute

3-barn set pullet farm:

- 2 60-gallon per minute wells – one for use and one as a back-up
- Average water usage for consumption is 1.3 gallons/minute throughout the flock cycle
- Additional water is used for evaporative cooling technology in warmer months, which brings the average total to 3 gallons/minute

Comparatively – In 3 days an average 1000-gallon per minute irrigation well will use more water than what a 4-barn chicken farm will use in a year.

Truck Traffic Associated with Barns

4-barn set broiler farm:

- 2 propane trucks
- 30 feed trucks
- 31 finished bird trucks
- 15 shavings/manure trucks
- 2 chick trucks
- Average of 10 trucks per week or 1.42 trucks per day
- All trucks are covered – eliminating dust, odor, and for the safety and comfort of the birds

Truck Safety Management

- 2 local trucking companies and one from outside the region – all experienced hauling on rural roads
- All trucking companies will comply with yearly DOT audits
- Trucking companies will be required to notify LPP of any DOT status changes

Setback and Zoning Requirements

- County Setbacks and local zoning followed
- If no county set-backs exist: 400 ft off of main roadway; ¼ mile from residences and other publicly used buildings

Windrowing Inside the Barns

- Litter will be broken down inside the barns through inside composting
- Litter will sit in place in windrows in the barns for 11 days, being turned once in that time
- Intent for temperatures to get 140-150 degrees to destroy bacteria and break down ammonia.

Mortality Management

- A separate shed will be built to hold mortality
- Cement floor and fully covered
- Mortality composted with litter to break down birds
- All Nebraska DEQ requirements apply
- Compost utilized as fertilizer

Antibiotic Usage

- Birds will be raised antibiotic-free
- Veterinarian on staff for any illness that arises
- Birds will be treated for illness as a part of the animal welfare policy

Water and Environmental Concerns

- Costco and Lincoln Premium Poultry are requiring all contracted growers to apply for an State Operating Permit through the State of Nebraska DEQ - *a permit that is not required by law*. We are doing this in an effort to provide the highest level of accountability for environmentally sound practices.
- Lincoln Premium Poultry has contracted with Nutrient Advisors of West Point to work with the growers on their nutrient management plans.
- All litter will be utilized in an appropriate manner through documented processes described in the nutrient management plans that the growers will be required to abide by.
- All nutrient management plans require annual surface and deep soil nitrate testing. Those results will be used to budget Nitrogen applications to meet and not exceed crop N requirements. Litter Nitrogen will not be applied at any greater rates than the crop producer would apply commercial Nitrogen.
- Each application site will maintain a current Phosphorus risk assessment in which soil type, soil slope, cropping practices, and nutrient management practices are considered to determine any risk of Phosphorus runoff from a field. Litter applications will be prioritized and managed in a way that minimizes risks of Phosphorus loss.
- Given the farm ground available in the region, based on calculations by the nutrient management team, the land that will be needed to utilize projected litter is less than 5% of the land available for such purposes. Additionally, on that land, it will be *replacing* current commercial fertilizer with an organic fertilizer.

Innovation and State of the Art Technology

- Costco and Lincoln Premium Poultry are revolutionizing the poultry industry with this project.
- They will be utilizing new systems that have not previously been used in the United States.
- This European and Canadian technology is state of the art and will set a high bar for future chicken production throughout the country.
- Costco and Lincoln Premium Poultry's grower contract is unlike any other in the country. It provides a new model that is already changing the industry norms.

Opportunities for Farmers and Agriculture Specialties

- Project has received extensive support from local farmers and farm groups, including the Farm Bureau, Corn Board, Soybean Board, and the Alliance for the Future of Agriculture in NE.
- To date, over 100 farmers in the area have signed and expressed interest to grow poultry for Lincoln Premium Poultry and Costco.
- Growers have shared that they are looking forward to an opportunity with a reputable company to diversify their farm income.
- This project will provide many career opportunities for young adults who want to return home or remain in the region as they enter the workforce, whether through a support position on the agriculture side of the project or through becoming a grower.
- The project will utilize approximately 350,000 bushels of corn each week, as well as approximately 3,000 tons of soybean meal. This grain will be purchased from local farmers and/or local elevators.

Conclusion

- Costco and Lincoln Premium Poultry have done their best to provide information on every aspect of the project. To date they have provided testimony in dozens of public hearings and have provided in-depth interviews through the media. They have also spent a great deal of time speaking to groups and organizations around the region that are interested in this project. We have also engaged with hundreds of citizens privately; taking the time they needed to address their concerns.
- This is an incredible opportunity to reenergize agriculture in the region, allowing many families to retain or bring a child back to the family farm.
- Costco and Lincoln Premium Poultry are committed to following the law and providing transparency. They have demonstrated commitment on both fronts and have continued to be willing to visit with anyone who has concerns or questions about the project.
- **Costco and Lincoln Premium Poultry are committed to their grower partnerships. They are committed to high levels of environmental stewardship. This project will generate a large amount of economic activity in the state of Nebraska and region, more than any project in recent history.**

ODOR FOOTPRINTS AND THE ODOR FOOTPRINT TOOL

An Overview

Introduction:

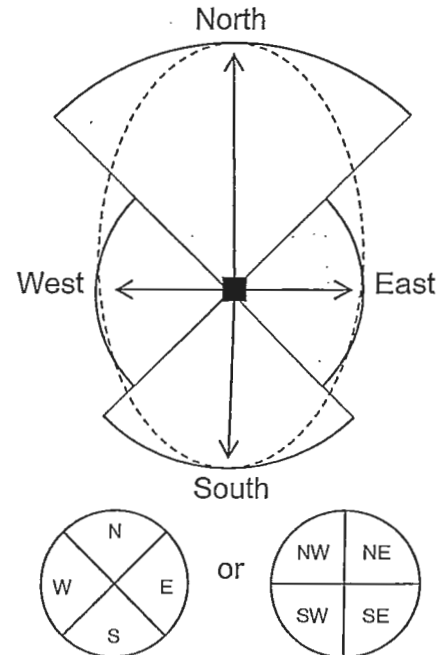
As animal production has changed and the facilities in which livestock and poultry are raised have grown in size, neighbors of animal feeding operations increasingly are expressing concerns about potential negative environmental effects on the surrounding rural community. Degradation of air quality is a prevalent concern, and the expected presence of offensive odors commonly is near the top of the list of issues and complaints. Livestock and poultry producers, community planners and officials, and rural residents in general, benefit from having objective, easily visualized information upon which to make well-informed decisions regarding odor impact, siting of facilities, and odor control. The Odor Footprint Tool is a planning and screening tool that can produce useful, science-based information, and help fill some of the void in objective information. This fact sheet provides a general description of odor footprints and the Odor Footprint Tool. The overview highlights the type of information conveyed, practical ways of representing setbacks and risk-based impact areas, the interpretation of risk-based odor impact, information needed to utilize the tool, and versions of the Odor Footprint Tool. More detailed information and instructions can be found in supplementary fact sheets.

Information Generated:

The Odor Footprint Tool provides minimum separation distances to maintain in four directions around animal production facilities to meet selected risk-avoidance targets. These *directional setback distances* extend to the north, south, east, and west of the given facilities (see figure); or to the northeast, southeast, southwest and northwest. The orientation of the setback distances aligns one direction with the direction of maximum exposure to annoying odors. The science behind the separation distances comes from the use of best-available research on the rates at which farm odors are given off, move and disperse, in conjunction with historical weather records from a representative location within an area.

Representing Setbacks and Impact Areas:

Directional setback distances are typically used to develop a simplified '*odor footprint*', which may be illustrated on a plat map or aerial photograph. An odor footprint provides a visual picture (top view) of the risk-based odor impact of livestock facilities. Specifically, it represents the area that is not expected to meet a selected target for avoiding odor annoyance. One way to show this is to draw quarter circles (shaded areas in figure), with the radius of each quarter circle being the respective directional setback distance. Quarter circles are relatively easy to produce and using this approach ensures consistency in showing setback distances. The risk-based impact area may also be shown as an oval, egg, or other smooth shape (dashed border in figure). Using a smooth shape removes sudden, unrealistic changes in the setback distance and shows a little less conservative impact area. It may be challenging, though, to draw a smooth shape on a site map and defend the choice.



Directional setback distances outline the expected extent of risk-based odor impact around a livestock odor source.

The approach taken to show the risk-based impact area is left to the user of the directional setback distance information. A major goal for the Odor Footprint Tool was that it be easy to use. To avoid the tool being too complicated, time-consuming, and expensive for practical use in the field, the Odor Footprint Tool incorporates a number of simplifications - one of these being limited definition of the precise shape of the odor footprint. When odor footprints are produced directly from dispersion modeling, they tend to be irregular, lopsided, and variable in shape, which means that no one common shape will always convey the shape of an odor footprint better than another. If a more accurate and precise picture of the shape of the odor footprint is required, reference should be made to an odor rose or example modeled footprints for the region.

Risk-Based Odor Impact:

A risk-assessment approach is used to determine minimum separation distances for odor, and the expected frequency of exposure to annoying odor levels is the critical measure used in assessing odor impact. Frequencies of annoyance and annoyance-free conditions are expressed as the percentages of hours over extended periods of time during which odors are projected to exceed and not exceed, respectively, an established odor threshold level. As a frame of reference, each 1% is roughly 1 hour on average every 4 days.

A risk-assessment approach is employed for two reasons. First, the potential frequency of exposure is a definable measure that correlates well with nuisance complaints (and odor is primarily a nuisance issue). By analogy, the fact that a barking dog can occasionally be heard a half mile away may be interesting to know and illuminating a street sign with an orange-colored light may be unpopular, but neither is an objective indicator of annoyance. On the other hand, when the dog's bark exceeds a given sound level (decibels) at a neighbor's house a number of hours a week, or the orange-colored light shines brightly (as measured in lumens or foot-candles) into a neighboring area for several hours most evenings, objective and much more useful information is available upon which to frame discussions, assess alternatives, make decisions, and evaluate outcomes of actions. Odor annoyance is presently projected to occur whenever the odor intensity at a given location is 2 or stronger on a standardized 0-to-5 scale, with 2 being a faint odor that would typically only be detected after a period of time or if attention were drawn to it. Second, many rural residents and communities are already using weather-based risk assessments in planning and decision-making. For example, new construction must often consider the location of flood plains, minimum snow and wind loads, and heating/cooling degree days. The underlying principle behind using information from these weather-based risk assessments is that the resulting facility will perform as desired in all but the more extreme weather scenarios (e.g. a 50-year storm event). For practical reasons, most facilities are not designed to guarantee performance under all weather conditions and less-than-desirable performance is tolerated under relatively rare, extreme circumstances. Similarly, livestock operations need to be planned and managed to limit the likelihood of odors reaching annoying levels at neighboring residences, but there also needs to be some tolerance for relatively rare odor events that may be impractical to prevent.

Needed Information:

To obtain directional setback distances using the Odor Footprint Tool, some basic information is needed about the existing and/or proposed facilities, location with respect to available weather data, target risk-avoidance level for odor annoyance, and local terrain. This basic information is required to use both the worksheet-based and spreadsheet versions of the Odor Footprint Tool.

Facility information:

To determine directional setback distances, the types and sizes of facilities need to be specified. This information is used to estimate baseline rates at which odor is released from the facilities. 'Odor emission numbers' are associated with several common types of animal housing and manure handling facilities. An odor

emission number represents the relative amount of odor released by the source facility into the air per unit of floor or surface area. Odor emission numbers are based upon odor measurements taken from several operating facilities within each facility type and include scaling factors that calibrate the underlying model projections with field measurements made by people trained to do 'odor sniffing'. The odor emission rate is also based upon facility size in terms of floor or surface area (top view). Facility size limits the number of animals that can be raised on a site and, for a given type of facility, is more closely associated with measured odor emission rates.

Some form of odor control may be implemented by the operation and this also needs to be considered. To account for the reduction in odor impact when utilizing a proven odor control technology, a representative odor control factor is applied, which reduces the overall odor emission rate and resulting directional setback distances.

Location and weather information:

Users of the Odor Footprint Tool must select a weather station location. The intent is that weather patterns that prevail at the selected station be reasonably representative of the proposed site. The Odor Footprint Tool determines directional setback distances based upon previously performed dispersion modeling using weather data for extended [typically 10-year] time frames.

The preferred option is to utilize historical weather records (actual meteorological data) from a representative weather station whenever this data is available. National Weather Service (NWS) stations are well-recognized sources of weather information, and modeling is usually performed first using NWS weather data. Modeling can also be performed using weather data from other sources, such as weather stations operated by commercial airports or the Automated Weather Data Network (AWDN), which is managed by several universities in the northern plains states. When this publication was written, dispersion modeling had been performed for 5 regions in Nebraska and 2 regions of South Dakota using NWS weather records. Recently, modeling for an additional region in each state was completed using AWDN data (designated with a * in lists below). Consequently, directional setback distances can be determined for the following regions:

Region (weather station location)

Northeast Nebraska (Norfolk, NE)

Southeast Nebraska (Lincoln, NE)

South-central Nebraska (Grand Island, NE)

Southwest Nebraska (North Platte, NE)

Nebraska panhandle (Scottsbluff, NE)

North-central Nebraska (Ainsworth*, NE)

Region (weather station location)

Southeast South Dakota (Sioux Falls, SD)

Western South Dakota (Rapid City, SD)

Northeast South Dakota (Watertown*, SD)

As resources are made available to support performing the required modeling, information will become available to utilize weather data for more localized areas and for other states.

Risk-avoidance level:

Risk avoidance is designated as an 'odor annoyance-free frequency'. The annoyance-free frequency is a very important, required input for the Odor Footprint Tool. The value selected represents the minimum percentage of hours during which a residence situated at or beyond the setback distance should be free from being exposed to annoying levels of odor. Options typically include 90%, 94%, 96%, 98% and 99% annoyance-free frequencies. For 96% odor annoyance-free conditions, for example, odors at locations beyond the specified distance are projected to be at annoying levels less than 4% (100% - 96%) of the time, while within this distance, odors may be at annoying levels more than 4% of the time. Since 1 hour over a period of 4 full days is a frequency of about

1%, a location at the 96% odor annoyance-free distance is projected to experience annoying odor levels for, on average, no more than 4 hours in a four-day period, which equates to an hour a day or 30 hours a month.

The annoyance-free frequency selected will have a dramatic effect on the resulting separation distance. In most cases, selecting the next-higher odor annoyance-free frequency will increase the separation distance more than does doubling the size of the operation. Selecting 99% (or wanting a higher percentage) may sound desirable, but may be unrealistic for many areas due to the large setback distances that would be required and challenges associated with applying such a high standard in agricultural regions. On the other hand, asking residents to endure annoying odor levels 10% of the time is probably equally unrealistic for most areas if positive neighbor relations are to be maintained. Selection of an annoyance-free frequency is where the vision and values of the given operation and of the surrounding rural community need to be considered and come into play.

Terrain:

The lay of the land around an animal feeding operation affects how and where odors move. Base directional setback distances are representative of sites where the surrounding land is fairly flat to gently rolling. Odorous air may be confined within valleys and will 'drain' downhill under calm conditions. Odorous air will also either go around significantly elevated areas or be dispersed more quickly when moved over higher terrain. Adjustments in separation distances are needed to account for these effects on the frequency of exposure to annoying odor levels. To account for noteworthy topographical effects, terrain factors are employed within the Odor Footprint Tool to increase, decrease or retain the separation distances in certain directions based upon the specified terrain.

Versions:

The Odor Footprint Tool is available to users in worksheet-based and spreadsheet versions. Both versions require the same basic input information and produce minimum separation distances in four directions.

The worksheet-based version of the Odor Footprint Tool involves using a one-page worksheet, a few tables, and one or two sets of four graphs. These materials can be maintained as files on a computer and the worksheet may be completed electronically, or the materials can be printed out and the worksheet may be filled out by hand. While the fastest way to use the Odor Footprint Tool is to use the spreadsheet version, there are a few advantages to using the worksheet-based version. For one, a computer is not required to determine setback distances. Another advantage of completing a worksheet is that it is more obvious where to prioritize control odor on the operation; because going through intuitive steps along the way highlights the contributing sources of odor on an operation more clearly. Those who will regularly use a spreadsheet version of the Odor Footprint Tool are strongly encouraged to first use a worksheet-based version to help them know what information is most useful and more fully utilize results from the spreadsheet version. The University of Nebraska publication *Determining Separation Distances Using the Odor Footprint Tool: User's Manual for the Worksheet-Based Tool* provides step-by-step guidance in utilizing the materials that have been developed for Nebraska regions.

Spreadsheet versions of the Odor Footprint Tool utilize commonly available software (e.g. MS Excel®) to simplify and hasten the process of determining directional setback distances. This timeliness advantage can be especially beneficial when several scenarios are being considered. Since few if any hand calculations are needed, opportunities for calculation errors are also minimized. The University of Nebraska publication *Determining Separation Distances Using the Odor Footprint Tool: User's Manual for the Spreadsheet Tool* provides step-by-step guidance in utilizing the spreadsheet that has been developed for Nebraska regions.

The common element behind the various forms of the Odor Footprint Tool is the procedure developed and utilized at the University of Nebraska – Lincoln to determine separation distances. Other states or organizations

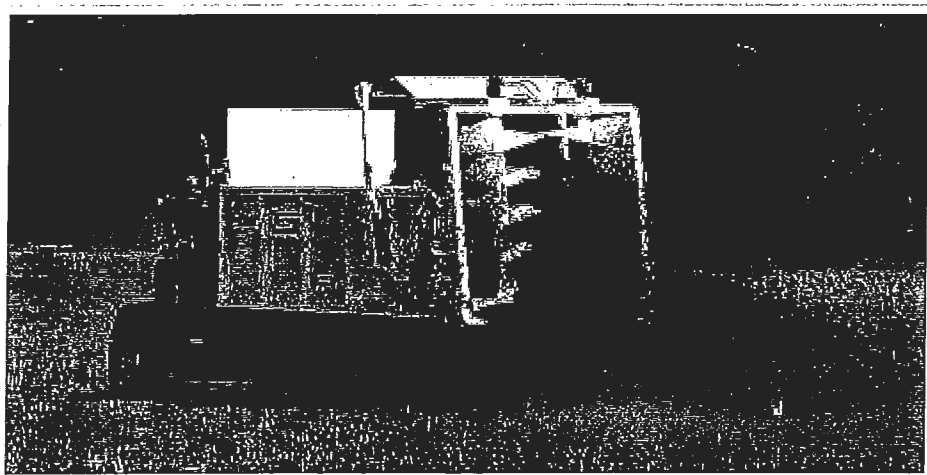
may adopt this procedure, and modify the presentation of the information to suit their regions. For example, South Dakota State University developed its own spreadsheet called SDOFT (South Dakota Odor Footprint Tool), but the underlying information was produced at the University of Nebraska – Lincoln and in the same way as for Nebraska regions.

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TUESDAY, APRIL 10, 2018

Does Manure Benefit Crop Productivity? Environment?

Rick Koelsch - Professor of Biological Systems Engineering (</author/rick-koelsch>)

Manure is often viewed by many as an environmental liability. However, if manure is applied at rates equal to or less than the nitrogen (N) requirement of a crop, can manure produce environmental benefits over commercial fertilizer? This was the focus of an Asian research group which summarized the results of 141 published studies

(<https://pubs.acs.org/doi/pdfplus/10.1021/acs.est.6b06470>) from Asia, Europe, and the U.S. comparing manure substitution for fertilizer. This article summarizes the “Take Home Messages” from this research paper.

Benefits to Crop Yields

The average of all grain related trials demonstrated a 5% increase in yield for manured fields (see Box A in Figure 1). The authors suggested that manure increases soil microbial biomass N (<http://soilquality.org.au/factsheets/microbial-biomass>) (see Box B in Figure 1), the living component of soil organic matter. As organic material is decomposed, microbial biomass N (MBN) is slowly converted to inorganic N at a time more in sync with crop N uptake, improving crop N uptake and crop yield. In addition, the authors suggest that the increased levels of other nutrients and improvements in soil physical properties also contributed to observed yield increases.

Peak increases in yield of 13% were observed when manure was applied at 50 to 75% of crop N requirements. Attempting to substitute more than 75% of the crop N requirement with manure often produced reduced yields. It is important to recognize the complimentary roles that manure and commercial fertilizer can play in a crop fertility program.

Reducing N Loss to the Environment

Commercial fertilizers add mineral N to our soils (ammonium and nitrate-N). Manures add a mix of organic and mineral N. Beef feedlot manure and poultry litter are about 90% organic-N. Slurry manures from swine and dairy operations may be roughly equal parts organic and mineral-N. Mineral N is more susceptible to environmental loss to the air and water.

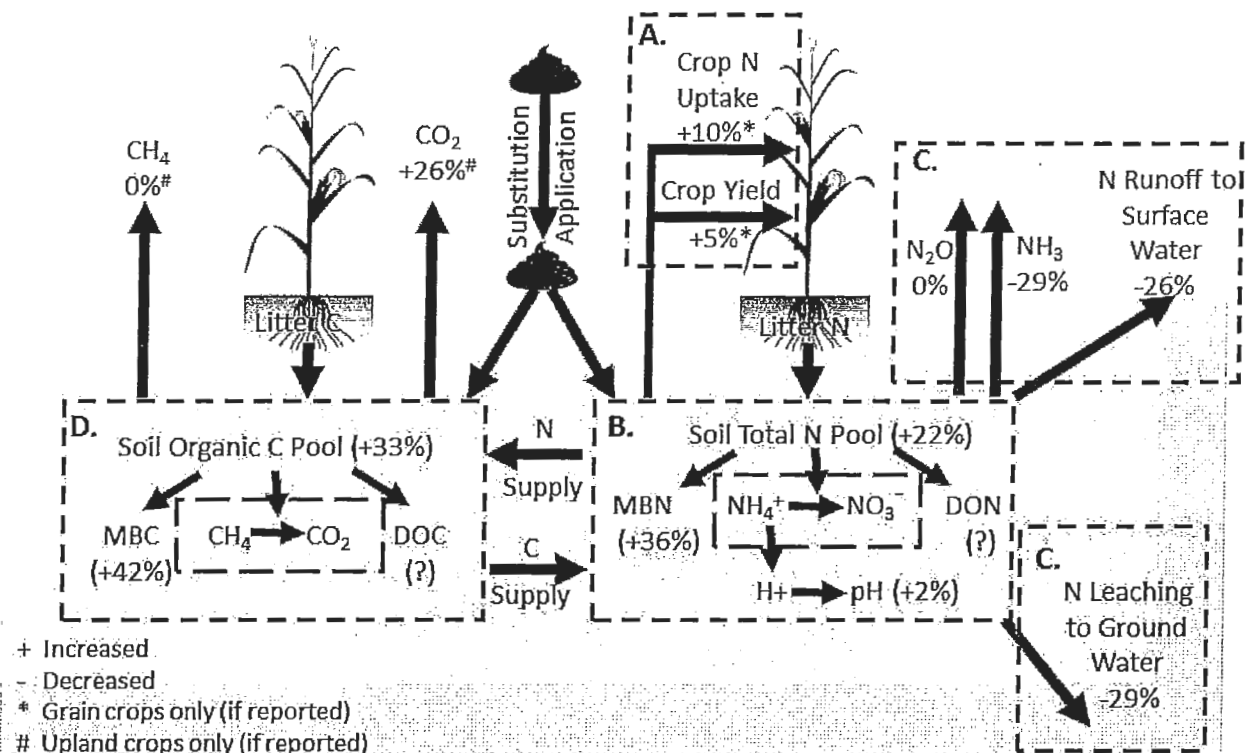


Figure 1. Effects of substituting manure for fertilizer. Estimates are averages for 141 research trials. Abbreviations: nitrogen (N), carbon (C), microbial biomass N (MBN), microbial biomass C (MBC).

Minimizing mineral N in soils while meeting crop nutrient requirement protects our water and air resources. Replacing fertilizer with manure resulted in decreased ammonium (NH₄) losses to air and N losses to surface and ground water by more than 25% (see Box C in Figure 1). These benefits were observed regardless of crop, manure type or substitution rate. The authors attributed these environmental benefits to both improvements in crop N use efficiency and greater N storage as microbial biomass nitrogen that is released closer to crop's N utilization timing.

This study also reported increases in water stable aggregates and cation exchange capacity for manure amended soils; this helps hold ammonium-N in the root zone until the crop can use it. Previous articles have summarized the benefits of manure for increasing soil aggregates (<https://water.unl.edu/article/animal-manure-management/manure-impact-soil-aggregation>) and preventing nutrient and erosion losses (<https://water.unl.edu/article/animal-manure-management/manure-impact-erosion-and-runoff-0>) to surface water.

Raising Soil Organic Carbon

This review also highlighted the benefits of manure for increasing soil organic C. Much of this increase in soil C was in the form of soil microbial biomass C (<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&cad=rja&uact=8&ved=0ahUKEwjn8PeAlqnZAhUJHqwkHTW7AckQFghbiomass-carbon-nsw&usq=AOvVaw0IwtNJ9o8LKwqfuq64AWew>) (see Box D in Figure 1). Manure provides an energy source for soil microbes, which significantly increases soil microbial activity and improves soil storage of both N and C in soil organisms (see Michigan State University Extension Publication – Manure effects on soil organism and soil quality (<http://msue.anr.msu.edu/uploads/files/AABI/Manure%20effects%20on%20soil%20organisms.pdf>)).

Increasing soil C levels can increase the risk of greenhouse gas emissions. However, this study suggested there were no changes observed in emissions of potent greenhouse gases, nitrous oxide (N₂O) and methane (CH₄).

However, some increase was observed in CO₂ emissions due to greater soil microbial activity. Overall, manured soils proved to be a sink for carbon in upland fields, thus benefitting the environment.

Bottom Line

Substituting manure for commercial fertilizer has positive societal benefits for food security (increased yields) and for environmental protection (less nitrogen loss and lower greenhouse gas emissions). Not addressed by this review is potential phosphorus losses to surface water. Manure is known to reduce erosion and runoff losses but phosphorus loss can increase if soil P levels are allowed to increase above optimum levels for crop production (see previous article (<https://water.unl.edu/article/animal-manure-management/manure-impact-erosion-and-runoff-0>)).

Thus, a strategy for increasing yields and protecting the environment will include applying manure:

- At or below crop N requirements (plus some supplemental commercial fertilizer N often including a starter fertilizer at planting) and
- To the same field only after soil P levels return to levels required for optimum crop production.

Yes, manure substitution for fertilizer can benefit our environment.

Reference: Xia, L., S. Lam, X. Yan, D. Chen. 2017. How does recycling of livestock manure in agroecosystems affect crop productivity, reactive nitrogen losses, and soil carbon balance? *Environ. Sci. Technol.* 7450-7457. (<https://pubs.acs.org/doi/pdfplus/10.1021/acs.est.6b06470>)

This article was reviewed by Shelby Burlew, Michigan State University Extension; Brian Krienke, University of Nebraska; Amy Schmidt, University of Nebraska; Leslie Johnson; University of Nebraska

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[Ag Site Planner \(http://agsiteplanner.unl.edu/\)](http://agsiteplanner.unl.edu/)

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[Land Application Training Online \(/welcome-land-application-training-online\)](/welcome-land-application-training-online/)

[Manure Publications \(/article/animal-manure-management/manure-related-extension-publications\)](/article/animal-manure-management/manure-related-extension-publications/)

[Contact the Manure Team \(/article/animal-manure-management/contact-manure-team\)](/article/animal-manure-management/contact-manure-team/)

UPCOMING EVENTS

AUG 23 **8:00 AM** [West Central Water and Crops Field Day \(/events.unl.edu/water/2018/08/23/124451/\)](/events.unl.edu/water/2018/08/23/124451/)
West Central Research and Extension Center

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PLANNING SP18025 - ATTACHMENT #3

From : Russell Miller
341 S. 52
Lincoln, NE 68510

To : Lincoln City/Lancaster County Planning Commission

Hello,

I am testifying in support of County Special Permit No. 18025 for a commercial feedlot at 13350 W. Wittstruck Road.

This is a clear case of NIMBY or not in my back yard. The problem will be to decide where does the back yard begin. Where does the applicant's, Randy Essence, 'backyard' begin and where does the opposition's backyard begin?

There are over 80 letters of opposition to this agriculture business venture. I reviewed about half of them. Most of the comments were concerned about loss of property value. Actually they were concerned about their house resale value even though their acreage house may be 1 mile or more away. So where does NIMBY start?

My first point is this land has been agriculture since the 1890s. Lincoln Lancaster Comprehensive Plans that date back to the 1970s recognized this land as agriculture. The zoning of this land, which also dates back to the 1970s, recognizes this land as agriculture with feedlots by special permit. The point is any buyer doing due diligence would know that feedlots could be their neighbors.

The opposition letters have made many claims about the loss of property values. The agriculture land will not lose any value because of this development. The living units **might** lose value. This is NIMBY. Why must the applicant lose property value by not being able to fully develop his property in a legally permitted manner? How far is NIMBY permitted? Should this applicant have opposed housing within a 3 mile radius of his property?

My second point is Lancaster County requires additional money for its bridge and road repair. It is reported that this project with its 4 buildings will add approximately 2 million dollars to the tax base. This exceeds the assessed value of the homes adjacent to (1.3 miles) this business on W. Wittstruck Road.

This chicken barn request is permitted by long established County law. By adhering to County law and permitting the operation of the chicken barn, the taxpayers of Lancaster County gain additional funds for bridge and road repair.

The other option is to follow Curt McConnell's opposition email of 16 July statement that there are "more than 200 people, exceeding the population of Denton -- within 1 1/2 miles of the site" and to have the area incorporated. Then they can set their own zoning laws.

Thank you
Russell Miller

Nebraska Animal Feeding Operation Siting Matrix

A Livestock Operation Size		Number		Points	Score
1	Number of animals (for multiple species or production phases, record separately)	190,000			
2	Animal Units (see Animal Units tab for calculator)	1,900			
		Yes	No		
1	Large livestock operation (1,000 animal units or more)	X			
2	Medium livestock operation (300 animal units to 999 animal units)		X		
3	Small livestock operation (less than 300 animal units)	X	X		

NDEQ STATUS

B Environmental Protection Plans		Yes	No	Points	Score
1	NDEQ has issued letter that no construction and/or operating permit is required	☒	☐	30	30
2	All NDEQ construction and operating permit(s) will be in place prior to operation, as required, including the following (if not applicable, write NA):	☒	☐	30	30
3	Nutrient Management Plan	X			
4	Animal Mortality Management Plan	X			
5	Request for Inspection of Animal Feeding Operation (Title 130 - Form A)	X			
6	Permit Application (Title 130 - Form B)	X			
7	Applicant Disclosure (Title 130 - Form C)	X			
8	Livestock Feeding Operation Narrative	X			
9	Livestock Feeding Operation Site Plan, Construction Drawings, and Maps	X			
10	Construction Quality Assurance Plan		X		
11	Manure Production and Storage/Treatment Calculations	X			
12	Operation and Maintenance Plan	X			
13	Chemical Management Plan	X			
14	Emergency Response Plan	X			
15	Sludge Management Plan		X		
16	Livestock Operation Closure Plan	X			
17	Best Management Practices for Odor Control	X			
SUBTOTAL (subtotal not to exceed 30 points for this section)					30

SETBACKS/SEPARATION DISTANCES

C Siting relative to dwellings and public places (refer to Separation Distances tab)		Yes	No	Points	Score
1	Separation meets or exceeds county setbacks, or an impact easement / distance waiver is in place	☒	☐	30	30
	If YES, move to Section D. If NO, answer questions C2-C7.				
	Enter number of dwellings (Formula may be used to calculate points, number = N)	Number	Formula		
2	Within 1.5 times the separation distance for odor and the separation distance for odor		$(5-N) \times 2$	0	0
3	Within the separation distance for odor and 1/2 the separation distance for odor		$-1 \times N^2$	0	0
4	Within 1/2 the separation distance of odor		$-10 \times N^2$	0	0
		Yes	No	Points	Score
5	If dwellings or public places exist within 1.5 times the separation distance for odor, have verified that none are located downwind of the site for prevailing wind direction(s) - via representative wind rose (see tab) or documented local weather data	☐	☐	5	0
6	If dwellings or public places exist within the county setback (or separation distance for odor if no county setback), have verified that none are located downwind of the site for prevailing wind direction(s) - via representative wind rose or documented local weather data	☐	☐	15	0
7	Was the Nebraska Odor Footprint Tool or other third-party, science-based tool used to assess siting relative to impacts on private dwellings and public places?	☐	☐	2	0
SUBTOTAL (total not to exceed 30 points for this section)					30

OTHER CONSIDERATIONS

D Environmental and Zoning Compliance Record		Yes	No	Points	Score
1	Owner has operated an animal feeding operation (AFO) for at least 5 years AND has been issued NO judicial enforcement action by a State or Federal Department of Justice within the last 5 years	☐	☒	5	0
<i>SUBTOTAL</i>					0
E Water Quality Protection - Livestock Facilities		Yes	No	Points	Score
1	The majority of animals housed within a confinement building	☒	☐	2	2
For only the facility that contains the majority of manure or effluent, select any that describe the livestock waste control facility:		☒	☒	☒	☒
2	Open lot with stockpile	☐	☒	0	0
3	Vegetative treatment system for runoff	☐	☒	1	0
4	Runoff containment structures	☐	☒	2	0
5	Roofed manure containment	☒	☐	2	2
6	Concrete-equivalent containment structure	☐	☒	2	0
7	Clay-lined or Geomembrane-lined containment structure	☐	☒	1	0
8	Additional storage capacity (25% or more than NDEQ requirements)	☒	☐	2	2
9	Select the smallest separation distance between any well used for domestic purposes and a Livestock Waste Control Facility:	☒	☒	☒	☒
	100 to 150 feet	☒	☐	0	0
	151 to 300 feet	☐	☒	1	0
	301 feet to 1,000 feet	☐	☒	2	0
<i>SUBTOTAL (total not to exceed 15 points for this section)</i>					6
F Odor and Dust Control for Facilities		Yes	No	Points	Score
Check all that apply for the majority of animal confinement or manure storage:		☒	☒	☒	☒
1	Biofilter treatment of exhaust air from fans (primarily for odor control)	☐	☒	3	0
2	Oil/water sprinkling for dust control in animal areas	☐	☒	2	0
3	Electrostatic/ionization system for dust control in animal areas	☐	☒	2	0
4	Windbreaks placed to intercept air emissions	☐	☒	2	0
5	Solids routinely separated from liquids and:	☒	☐	1	1
	Stockpiled for later application to land	☒	☐	0	0
	Composted, dried and used for bedding, or equivalently treated.	☒	☐	1	1
6	Cover on manure storage or first (settling) cell of multi-cell system	☐	☒	1	0
	Impermeable cover with flare or gas treatment	☐	☒	2	0
7	Aerobic treatment	☐	☒	1	0
8	Anaerobic digester	☐	☒	3	0
9	Other supplemental odor reduction measures (supported by verifiable scientific data)	☐	☒	2	0
<i>SUBTOTAL</i>					2

G Manure Application Practices		Yes	No	Points	Score
1	Select the <u>primary method of manure application</u> under normal conditions for the majority of <u>manure applied</u> and indicate any <u>control practices</u> followed for application to 50% or more of the <u>land receiving manure</u> :	☒	☒	☒	☒
1a	Subsurface application (also referred to as "injection")	☐	☒	3	0
1b	Surface-applied solids	☐	☒	-2	0
	Incorporated within 2 days of application	☐	☒	3	0
	Incorporated within 3 to 7 days of application	☐	☒	2	0
	Incorporated prior to planting but more than 7 days after application	☒	☐	1	1
1c	Surface-applied slurry or effluent (excl. sprinkler irrigation)	☐	☒	-5	0
	Application equipment discourages drift and encourages entry into soil	☐	☒	2	0
	Incorporated within 2 days of application	☐	☒	3	0
	Incorporated within 3 to 7 days of application	☐	☒	1	0
1d	Sprinkler irrigation	☐	☒	-3	0
	Utilize drop nozzles or distribution hoses	☐	☒	1	0
	Utilize a monitoring and alarm system	☐	☒	1	0
	Irrigation distribution system has a complete disconnect from the water source or appropriate mechanical devices, as specified by NDEQ, during application	☐	☒	1	0
	Irrigation distribution system does NOT have a complete disconnect from the water source during application or appropriate mechanical devices, as specified by NDEQ	☐	☒	-2	0
2	Cover conditions for manure application (Indicate all that apply for the selected method and majority of land receiving manure)	☒	☒	☒	☒
	Conservation tillage is implemented	☒	☐	1	1
	No-till farming is implemented	☒	☐	2	2
	Application is primarily to fields with a growing crop	☐	☒	1	0
	Application is primarily to fields with an established crop canopy	☐	☒	2	0
	Cover crops or additional approved erosion-control practices are used	☐	☒	2	0
	SUBTOTAL (total not to exceed 6 points for this section)				4
H Manure Application Separation		Yes	No	Points	Score
1	Additional separation provided, above and beyond minimum requirements, from land application areas to closest dwelling or public place. Applies to all application areas.	☒	☒	☒	☒
	Additional 50 to 100 feet	☐	☒	1	0
	Additional 101 to 500 feet	☐	☒	2	0
	Additional 501 to 1,320 feet	☐	☒	3	0
	Additional 1,321 to 2,640 feet	☐	☒	4	0
	Additional 2,641 feet and greater	☐	☒	5	0
2	Vegetative buffer (minimum 50 feet width) will be maintained between land application areas and any dwellings or public places	☐	☒	2	0
3	Vegetative buffer (minimum 50 feet width) will be maintained between land application areas and any surface waters	☐	☒	3	0
4	Vegetative buffers present on 25 to 50% of natural surface drains on all application areas	☐	☒	1	0
5	Vegetative buffers present on 51 to 100% of natural surface drains	☐	☒	3	0
	SUBTOTAL				0

I Additional Assurance of Environmental Protection		Yes	No	Points	Score
1	Assurance that the following plans will be kept current, displayed and/or readily accessible on site, and included in training procedures during operation:	☒	☒	☒	☒
	Operation and Maintenance Plan	☒	☐	1	1
	Animal Mortality Composting Plan	☒	☐	1	1
	Chemical Management Plan	☒	☐	1	1
	Emergency Response Plan	☒	☐	1	1
	BMP for Odor Control Plan	☒	☐	1	1
	Nutrient Management Plan	☒	☐	5	5
2	Assurance that earthen livestock waste control facilities having compacted-soil liners will be constructed to meet and be verified as having a permeability rate ≤ 0.125 inch/day	☒	☐	1	1
3	Assurance that earthen livestock waste control facilities having geomembrane liners will be installed according to the construction quality assurance / quality control plan and documentation will be maintained	☐	☒	1	0
SUBTOTAL					11
J Traffic		Yes	No	Points	Score
1	Main entrance to livestock operation located on minimum maintenance road	☐	☒	-3	0
2	Livestock operation has a cost-share agreement with the county for road maintenance	☐	☒	5	0
3	Vehicle entrance and turnaround is designed so that traffic will not be required to back into the livestock operation from the county road	☒	☐	3	3
4	Heavy vehicle route established that avoids bridges or roads with weight restrictions	☒	☐	3	3
5	For the primary application method under normal conditions, the livestock operation can avoid county roads to apply:	☒	☒	☒	☒
	Up to 25% of manure nutrients generated	☐	☒	1	0
	25 to 50% of manure nutrients generated	☐	☒	2	0
	More than 50% manure nutrients generated	☐	☒	3	0
SUBTOTAL					6
K Authorized Representative and Manager Residency		Yes	No	Points	Score
1	Authorized representative lives or will live within one year of beginning operation:	☒	☒	☒	☒
2	On the site or within the separation distance for odor	☒	☐	5	5
3	Between separation distance for odor and 10 miles of the livestock operation	☐	☒	3	0
4	Between 10 miles and 50 miles of the livestock operation	☐	☒	1	0
5	Manager lives or will live within one year of beginning of operation:	☒	☒	☒	☒
6	On the site or within the separation distance for odor	☒	☐	5	5
7	Between separation distance for odor and 10 miles of the livestock operation	☐	☒	3	0
8	Between 10 miles 50 miles of the livestock operation	☐	☒	1	0
SUBTOTAL					10
L Neighbor - Community Communication		Yes	No	Points	Score
1	Communication with 100% of the property owners within a one-mile radius	☐	☒	5	0
SUBTOTAL					0
M Economic Impact Factors		Yes	No	Points	Score
1	Will add property value as of county permit issue date by:	☒	☒	☒	☒
	\$50,000-\$250,000	☐	☒	1	0
	\$250,000-500,000	☐	☒	2	0
	\$500,000-\$1,000,000	☐	☒	3	0
	More than \$1,000,000	☒	☐	4	4
2	Will create the following number of new full-time or equivalent jobs:	☒	☒	☒	☒
	1 to 3	☒	☐	1	1
	4 to 9	☐	☒	2	0
	10 or more	☐	☒	3	0
SUBTOTAL					5

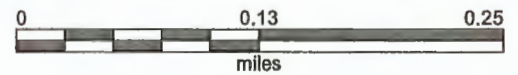
N Landscape and Aesthetic Appearance		Yes	No	Points	Score
	Check all that will apply:	☒	☒	☒	☒
1	Landscaping plan will be implemented	☒	☐	2	2
2	Visual barriers (i.e. fences, gating, trees) will be put in place	☒	☐	2	2
3	Animal mortality will be managed so as to not be viewable from a public road	☒	☐	1	1
	Handling of animal mortalities will be viewable from public road	☐	☒	-3	0
4	Site designed to facilitate clean surface water drainage away from livestock operation	☒	☐	2	2
5	Separation distance of at least 1.5 times county required distance from centerline of frontage road to livestock facility	☒	☐	3	3
	SUBTOTAL				10
	Cummulative Points				114

Total Score (A project that reaches 75 points or above shall be granted a conditional/special use permit by the county) =

114

Randy Essink
94% Odor Footprint Setback

PLANNING - SP18025 - ATTACHMENT #4B



- Residences
- Odor Footprint
- Proposed Facility Boundary
- Business





NEBRASKA ODOR FOOTPRINT TOOL

Separation Distance Results



Project title: Randy Essink Prepared for: Lancaster County
 Site location: Lancaster County, NE Prepared by: Nutrient Advisors
 Location for weather data: Beatrice, Neb. (Southeast Neb.) Date prepared: June 14, 2018

	Source Facility 1	Source Facility 2	Source Facility 3	Source Facility 4
Type of facility:	Poultry, Broiler Floor-raised on litter			
Total plan area:	(sq. ft.) 151,200			
Total number of animals:	190,000			
Base odor control:	No supplemental odor control implemented			
Percentage of total odor:	100%			
Alternate odor control:	No supplemental odor control implemented			
New Percentage of total odor:	100%			

		Separation Distance (miles)			
		North	East	South	West
BASE PLAN	90%	0.16	0.06	0.08	0.12
	94%	0.21	0.12	0.13	0.18
	96%	0.28	0.16	0.16	0.22
	98%	0.44	0.30	0.29	0.37
	99%	0.67	0.57	0.53	0.67

ALTERNATE PLAN	90%	0.16	0.06	0.08	0.12
	94%	0.21	0.12	0.13	0.18
	96%	0.28	0.16	0.16	0.22
	98%	0.44	0.30	0.29	0.37
	99%	0.67	0.57	0.53	0.67

	North	East	South	West
Terrain: (apply on receptor-by-receptor basis)	Rolling terrain	Rolling terrain	Rolling terrain	Rolling terrain

Funding provided by: The Nebraska Environmental Trust
 Pork Checkoff



NEBRASKA ODOR FOOTPRINT TOOL
Values Used in the Calculation of Separation Distances



Project title:
Site location:
Location for weather data:

Randy Essink
Lancaster County, NE
Beatrice, Neb. (Southeast Neb.)

Prepared for: Lancaster County
Prepared by: Nutrient Advisors
Date prepared: June 14, 2018

BASE PLAN

Select odor sources:

Select type of facility:

Number of animals per facility:

Facility plan dimensions:

a) Length & Width { (ft)
 (ft)
OR b) Diameter: { (ft)

Number of identical facilities:

Select odor control used in Base Plan:

Total plan area: (sq. ft.)

OFT odor emission number*:

Odor control factor:

Facility odor emission rate*: (10^6 OU/s)

Source Facility 1

Poultry, Broiler

Floor-raised on litter

47,500

600

63

0

4

No supplemental odor
control implemented

151,200

10

1

1.51

Source Facility 2

0

0

0

0

0

0

0

0

0

0

0

Source Facility 3

0

0

0

0

0

0

1

0

0

0

0

Source Facility 4

0

0

0

0

0

0

1

0

0

0

0

Total odor emission rate*:

1.51×10^6 OU/s

* The emission values shown have been scaled up -
based upon calibration study results - for use with
the Odor Footprint Tool.

ALTERNATE PLAN

Select odor control option being
considered:

Odor control factor:

New total odor emission rate*:

Source Facility 1

No supplemental odor
control implemented

1

Source Facility 2

0

Source Facility 3

0

Source Facility 4

0

1.51×10^6 OU/s



STATE OF NEBRASKA
Office of the Attorney General

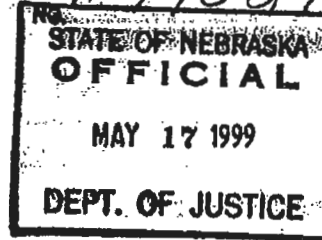
MAY 17 1999

STATE ELECTRICAL DIVISION

2115 STATE CAPITOL BUILDING
LINCOLN, NE 68509-8920
(402) 471-2682
TDD (402) 471-2682
CAPITOL FAX (402) 471-3297
1235 K ST. FAX (402) 471-4725

DON STENBERG
ATTORNEY GENERAL

STEVE GRASZ
LAURIE SMITH CAMP
DEPUTY ATTORNEYS GENERAL



DATE: May 13, 1999
SUBJECT: Poultry Processing Plants - Electrical Inspection
REQUESTED BY: Terry L. Carlson, Executive Director
WRITTEN BY: Don Stenberg, Attorney General
Mark D. Starr, Assistant Attorney General

You have asked whether poultry feeder buildings are subject to inspection pursuant to the State Electrical Act. Each of the buildings you describe will house approximately 40,000 young chickens until they are ready for processing. Two such buildings have been erected at a site near Tecumseh and plans are to build about six more such buildings on the site. The poultry processing company reportedly does not own the buildings; only the chickens. The company contracts with investors to raise the chickens to processing weight.

The company also proposes to contract with area farmers to raise the company's chickens in the same type of buildings. The farmers are apparently to have the necessary buildings constructed. The company will not own these buildings.

The company also may have plans to have such buildings constructed on its own land.

Nebraska. Rev. Stat. § 81-2124 (1) (1994), provides that "[a]ll new electrical installations for commercial or industrial applications, including installations both inside and outside of the buildings, and for public-use buildings and facilities and any installation at the request of the owner shall be subject to the inspection and enforcement provisions of the State Electrical Act."

David K. Arterburn
L. Jay Bartel
Kristine D. Brenneis
J. Kirk Brown
David T. Bydalek
Dale A. Comer
Suzanna Glover-Eitrich
Royce N. Harper

Jason W. Hayes
Amber F. Herrick
Lauren L. Hill
Amy Hollenbeck
William L. Howland
Marilyn B. Hutchinson
Therese N. James
Kimberly A. Klein

Jennifer S. Lilledahl
Charles E. Lowe
Lisa D. Martin-Price
Lynn A. Nelson
Donald J. B. Miller
Ronald D. Moravec
Fredrick F. Neld
Marie C. Pawol

Perry A. Pirsch
Paul N. Potodie
Mark D. Raffety
Celia Heathershaw Risko
Robert B. Rupe
James D. Smith
James H. Spears

Mark D. Starr
Martin Swanson
John R. Thompson
Barry Wald
Terri M. Weeks
Melanie J. Whitmore-Mantzios
Linda L. Willard

Terry L. Carlson
May 13, 1999
Page -2-

Neb. Rev. Stat. § 81-2102 (9) (1994), defines a commercial installation as one intended for commerce or for a family dwelling in excess of a single-family living unit.

Neb. Rev. Stat. § 81-2102 (12) (1994), defines an industrial installation as one "intended for use in the manufacture or processing of products involving systematic labor or habitual employment and shall include installations in which agricultural or other products are habitually or customarily processed or stored for others, either by buying or reselling on a fee basis." (Emphasis added.)

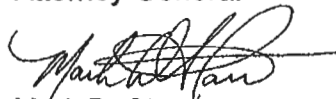
Nebraska. Rev. Stat. § 81-2121 (5) (1994), provides that "[n]othing in the State Electrical Act shall be construed to: (p)rohibit an owner of property from performing work on his or her principal residence or farm property, excluding commercial or industrial installations or installations in public-use buildings or facilities, or require such owner to be licensed under the act."

Although the statute just quoted has to do more with when licensing is required of the installer, we mention it because it appears to contemplate that some farm installations may also be "commercial or industrial" in nature so as to trigger regulatory oversight. But on the other hand, it also suggests that the legislature envisioned that there would be some electrical installations on farm property apart from those on the farmer's personal residence which would not be considered commercial or industrial in nature.

Under the facts presented, the buildings at issue are installations in which large numbers of poultry are being fed and stored for others. This falls within the statutory definition of industrial installation at Neb. Rev. Stat. § 81-2102(12). If the number of poultry were not of a substantial size, a feeding operation would not rise to the level of an industrial installation. Likewise, if a farmer were feeding his own poultry, that installation would not fall within the statutory definition of an industrial installation.

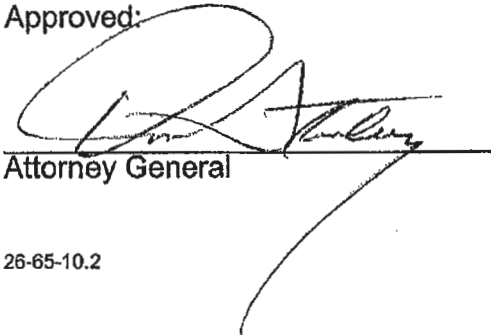
Sincerely,

DON STENBERG
Attorney General



Mark D. Starr
Assistant Attorney General

Approved:



Attorney General



JOHNS HOPKINS

CENTER *for* A LIVABLE FUTURE

The Johns Hopkins Center for a Livable Future
Bloomberg School of Public Health
615 North Wolfe Street, W7010
Baltimore, MD 21205

September 19, 2016

Mayor Getzschman and Fremont City Council
400 E. Military Ave.
Fremont, NE 68025

Disclaimer: The opinions expressed herein are our own and do not necessarily reflect the views of The Johns Hopkins University.

RE: Costco Wholesale and Lincoln Premium Poultry Processing Plant and Broiler Production

Dear Mayor Getzschman and members of the Fremont City Council,

We are researchers at The Johns Hopkins Center for a Livable Future, based at the Bloomberg School of Public Health in the Department of Environmental Health and Engineering. The Center engages in research, policy analysis, education, and other activities guided by an ecologic perspective that diet, food production, the environment, and public health are interwoven elements of a complex system. We recognize the prominent role that food animal production plays regarding a wide range of public health issues surrounding that system.

We have been contacted by citizens of Dodge County who are concerned about Lincoln Premium Poultry and Costco Wholesale's proposed poultry processing plant south of Fremont. Citizens have also voiced concern about plans for approximately 400 new broiler* houses in the area, which would house a combined 17 million broilers (approximately 19 times larger than Nebraska's 2012 broiler inventory).† In response to local citizens' concerns, below we present a summary of the peer-reviewed scientific literature on the human health and environmental concerns associated with poultry processing facilities and industrial broiler production. Detailed

* Chicken raised for meat

† U.S. Department of Agriculture. Nebraska State Profile, 2012 Census of Agriculture. National Agricultural Statistical Service Website.
https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Nebraska/cp99031.pdf.
Published 2012. Accessed July 18, 2016.

information regarding these concerns can be found in Appendices I and II. We have also reviewed information provided by the Greater Fremont Development Council regarding plans Lincoln Premium Poultry and Costco Wholesale have to address some community concerns, such as worker safety, water use, wastewater treatment, poultry transport, traffic, waste management and spread of disease.[‡] It is possible that these planned activities and practices could reduce risks to workers and community members, but many of the proposed plans lack regulatory requirements and enforcement mechanisms. Therefore, we are considering all relevant literature related to poultry processing plants and production operations to fully describe potential risks.

Based on evidence from numerous scientific studies of industrial poultry operations and processing facilities, the operations proposed by Costco Wholesale and Lincoln Premium Poultry may present a range of health risks to members of the surrounding communities. We recommend that these risks are taken into account as decisions are made about i) the future of this project and ii) requirements for active monitoring and plans for responding if human health risks or environmental degradation are identified.

Summary

There are serious human health and environmental concerns associated with large poultry processing plants, including occupational risks, exposure to air pollution and pathogens, and the environmental impacts of excessive water use and wastewater discharge (for a more in-depth review of these concerns and references, please refer to Appendix I on pages 5-6). The poultry processing industry has some of the highest injury rates among U.S. industries, and processing plant workers are at risk of exposure to pathogens, including those that are drug resistant, which can be spread to family members and the surrounding community. The anticipated increase in vehicular traffic to and from the processing plant may increase traffic-related air pollution, increasing the risk of developing or exacerbating respiratory and other conditions. Johns Hopkins researchers have also found that poultry trucks driving to processing plants can spread harmful bacteria, including drug-resistant bacteria, into the environment, exposing other drivers, pedestrians, and rural communities to these bacteria. Lastly, poultry processing plants require a substantial amount of water and discharge potentially hazardous wastewater. The extensive water needs of processing plants may affect the availability of water that neighboring communities need for drinking and household use, and wastewater high in nutrients, suspended solids, fecal coliforms and possibly pathogenic bacteria could threaten water quality if discharged into waterways.

[‡] Greater Fremont Development Council. Project Rawhide FAQ. http://www.fremontecodev.org/media/userfiles/subsite_34/files/RAWHIDE/Project%20Rawhide%20FAQ%204%2022%2016.pdf. Published April 22, 2016. Accessed August 5, 2016.

Industrial broiler production is also associated with a range of human health and environmental risks (a more in-depth review of these risks, including references, is provided in Appendix II on pages 7-10). The dense confinement used in industrial broiler operations present opportunities for disease transmission among animals, and between animals and humans. Nearby residents, especially if they live in proximity to multiple operations, may have an increased risk of infection from the transmission of harmful microorganisms from broiler operations via flies or contaminated air and water. Community members living near broiler operations also face increased exposure to air pollution from broiler operations, which can exacerbate respiratory conditions including asthma, bronchitis, and allergic reactions. Manure from broiler operations can also contaminate ground and surface waters with nitrates, drug residues, and other hazards. Increased exposure to these agents is associated with adverse health effects, including cancer, birth defects, thyroid problems, methemoglobinemia, neurological impairments, and liver damage.

Recommendations

We recognize that the Greater Fremont Development Council, Costco Wholesale, and Lincoln Premium Poultry have identified some steps to reduce risks to poultry workers and the community. Many of these plans fall outside of the current regulatory structure that applies to poultry production and processing facilities, so monitoring and enforcement is unlikely to occur without strict requirements developed by the City Council and other government agencies. To address existing regulatory gaps, we recommend developing a plan for robust, transparent environmental monitoring that includes baseline and periodic testing of air and water quality around production sites and the processing plant facilities. The plan should also clearly state what actions would be required of Costco Wholesale and/or Lincoln Premium Poultry if environmental contamination and increased human health risks were found.

Conclusion

We appreciate your consideration of environmental and human health risks associated with industrial poultry production and processing. We are available to answer any questions about the information we have presented. Through our research, we know that local government agencies

often face barriers related to regulating industrial food animal production due to narrow regulations and limited resources,[§] and we are prepared to serve as a resource to your office.

Sincerely,

Jillian P. Fry, PhD, MPH

Assistant Scientist, Department of Environmental Health and Engineering
Johns Hopkins Bloomberg School of Public Health
Project Director, Food Production and Public Health
Johns Hopkins Center for a Livable Future
Johns Hopkins University

Robert Martin

Senior Lecturer, Department of Environmental Health and Engineering
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Claire M. Fitch, MSPH

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Carolyn R. Hricko, MPH

Research Assistant, Food Systems Policy
Johns Hopkins Center for a Livable Future
Johns Hopkins University

[§] Fry JP, Laestadius LI, Grechis C, Nachman KE, Neff RA. Investigating the role of state and local health departments in addressing public health concerns related to industrial food animal production sites. *PloS one*. 2013;8(1):e54720.

Fry JP, Laestadius LI, Grechis C, Nachman KE, Neff RA. Investigating the role of state permitting and agriculture agencies in addressing public health concerns related to industrial food animal production. *PloS one*. 2014;9(2):e89870.

Appendix I. Environmental and human health concerns associated with poultry processing

The main environmental and human health concerns associated with large poultry processing plants are:

- Occupational safety risks including injury and exposure to pathogens;
- Air pollution from increased traffic;
- Exposure of citizens to pathogens from poultry transport trucks; and
- Environmental impacts due to excessive water use and wastewater discharge.

Occupational safety risks for workers

There are significant occupational safety risks for slaughterhouse workers. According to the U.S. Government Accountability Office, the poultry processing industry ranks among the highest among all industries in the U.S. for occupational injury rates.¹ In addition, poultry processing plant workers, particularly those who are in contact with live poultry or carcasses, are at risk of exposure to pathogens.² Researchers have also found that poultry processing plant workers are at a higher risk than the general public of being carriers of drug resistant pathogens, such as methicillin-resistant *Staphylococcus aureus* (MRSA).³ These pathogens can cause infections that are harder to treat due to their resistance to certain antibiotics, and workers can spread these pathogens to their families and other community members.⁴⁻⁶

Our understanding is that Costco Wholesale and Lincoln Premium Poultry may plan to raise poultry without the routine use of antibiotics. While this practice would likely lessen the risk to workers and community members of infection with antibiotic-resistant bacteria, pathogens (antibiotic-resistant or otherwise) may still spread from industrial livestock operations to workers and into communities.⁷

Air pollution from increased traffic

The proposed poultry processing facility will increase vehicular traffic significantly due to the transportation needs of the 1,100 anticipated employees, the poultry transport trucks traveling to and from the 400 planned broiler houses, as well as other transport related to management and distribution operations. Air pollution from traffic increases the risk of developing or exacerbating respiratory and other conditions.⁸

Exposure to pathogens from transport trucks

Poultry transportation also has another important health risk. In 2008, Johns Hopkins researchers found that poultry trucks driving to processing plants spread harmful bacteria into the environment, exposing other drivers, pedestrians, and rural communities to these bacteria.

Researchers consistently detected drug-resistant bacteria in the air and on surfaces inside vehicles while driving behind poultry trucks.⁹ The study was conducted on a roadway as poultry trucks were transporting live birds to a processing plant. It is likely that driving behind poultry trucks in Dodge County would produce similar outcomes. This study exemplifies one facet of the increased burden of risk that the community may face as a result of having hundreds of thousands of birds transported to the proposed processing plant each day. According to the Greater Fremont Development Council, poultry transport trucks and the processing plant receiving dock will be enclosed.¹⁰ These steps may reduce the risk to community members, and should therefore be both required and monitored.

Excessive water use and wastewater discharge

Poultry processing is a water-intensive endeavor, requiring, on average, seven gallons of potable water per bird.¹¹ The Fremont City Council's decision to annex the land under consideration for the poultry processing plant allows the city to extend utilities services, including water, to this area. It is essential that the water allocation to the processing plant not impact the availability of water to the neighboring communities that also rely on this water source for drinking and household use.

In addition, the discharge of processing plant wastewater is a potential hazard to nearby waterways and communities. Poultry processing plant effluents are high in nitrogen, phosphorus, and total suspended solids,¹² all of which could threaten water quality if discharged into waterways. The proposed poultry processing plant would be a source of these nutrients, as well as fecal coliforms and possibly other pathogenic bacteria,¹³ discharged into the surrounding waterways including the Platte River, a major tributary of the Missouri River. Dodge County encompasses four watersheds (the Lower Platte-Shell, Lower Platte, Lower Elkhorn and Logan), all of which contain water bodies considered impaired in 2014, the most recent reporting year.¹⁴ Nitrogen, phosphorus and pathogens are already among the listed contaminants causing the impairment of these water bodies.¹⁴

In light of these concerns, it is especially important to ensure that the City of Fremont and Costco Wholesale maintain their commitment to treat all wastewater from the processing facility at the city's municipal wastewater treatment plant.¹⁰ Baseline and periodic monitoring should be conducted to ensure that the processing plant does not adversely affect the water quality in the area.

Appendix II. Human health concerns associated with industrial broiler production

The main human health concerns associated with industrial broiler production include:

- Infections resulting from the potential transmission of harmful microorganisms from broiler operations to nearby residents, for example, via flies or contaminated air and water;
- Increased exposure to air pollution from broiler operations associated with health effects, including exacerbation of asthma, bronchitis, and allergic reactions; and
- Increased exposure to nitrates, drug residues, and other hazards that may be present in ground and/or surface waters contaminated by manure from broiler operations associated with health effects, including thyroid problems, methemoglobinemia, neurological impairments, and liver damage.

Disease transmission

Crowded conditions in industrial broiler operations present opportunities for the transmission of bacterial pathogens among animals, and between animals and humans.¹⁵ Human exposure to infectious agents can occur through multiple routes, including breathing contaminated air and drinking contaminated water.^{6,9,16-18}

Of additional concern is exposure to pathogens that are resistant to antibiotics used in human medicine. The non-therapeutic use of antibiotic drugs as a means for growth promotion** in animals is commonplace—an estimated 80 percent of antibiotics sold for human and animal uses in the U.S. are sold for use in food-producing animals.¹⁹ Administering antibiotics to animals at levels too low to treat disease fosters the proliferation of antibiotic-resistant pathogens. Resistant infections in humans are more difficult and expensive to treat²⁰ and more often fatal²¹ than infections with non-resistant strains. As mentioned previously, it is our understanding that antibiotics may not be used in the proposed broiler production. While this may reduce the risk of infection with antibiotic resistant-bacteria to community members and workers, pathogens can still spread from poultry operations to communities.⁷

A growing body of evidence provides support that pathogens can be found in and around broiler operations. In broiler operations that administer antibiotics for non-therapeutic purposes, broilers have been shown to be carriers of antibiotic-resistant pathogens^{22,23} and these resistant pathogens have also been found in the environment in and around broiler production facilities, specifically in the manure^{24,25} and flies.²⁶ Additionally, *Salmonella* and *Campylobacter* are highly prevalent among U.S. broilers, and *Campylobacter* is found in about 50% of manure samples.³

** U.S. Food and Drug Administration (FDA) voluntary industry guidelines continue to endorse the use of antibiotics in livestock production for “disease prevention”, which allows for dosing that is largely indistinguishable from growth promotion, thus tolerating business as usual.

Campylobacter infections in people have led to gastrointestinal illness, neuromuscular paralysis, and arthritis.³ Manure runoff from broiler operations may introduce these harmful microorganisms into nearby water sources. Land application of broiler manure may present an opportunity for pathogens contained in the manure to leach into the ground or run off into recreational water and drinking water sources, potentially causing a waterborne disease outbreak.²⁵ This is of particular concern for the approximately 16% of Dodge County residents who rely on private wells for drinking water and household use.²⁷

Several studies have shown that workers in broiler operations are disproportionately exposed to pathogens: in a Dutch study, 5.6% of workers in broiler houses were carriers of MRSA²⁸ vs. 0.01% of the general population, and workers in broiler houses on the Delmarva Peninsula were found to have 32 times the odds of carrying gentamicin-resistant *E. coli* compared with other residents in the community.⁶ Colonized or infected workers may transport pathogens into their communities.⁶

People living near broiler operations may be exposed to harmful microorganisms, which have been found to spread in the air up to 3,000 meters from broiler operations.¹⁶ The shape and spread of this airflow varies with changes in wind patterns, making it difficult to predict which residents might be most affected.¹⁶ Infectious agents have been found on deposits of particulate matter several miles from operations.¹⁶ Harmful bacteria such as *Campylobacter* have been reported to enter and leave poultry operations via insects and ventilation systems.¹⁸

The elevated presence of flies near broiler operations can be more than a nuisance; it also may facilitate residents' exposure to pathogens, including antibiotic-resistant strains of *Enterococci* and *Staphylococci*.^{9,18} One study found that residences within a 0.5 mile of broiler operations had 83 times the average number of flies compared to control households.²⁸

Air pollution from broiler operations

The air inside broiler operations contains elevated concentrations of gases, particulate matter, pathogens, endotoxins, and other hazards.^{9,17,18,29,30} While these studies provide important insights on worker exposure to broiler operation air pollution, additional studies are needed to characterize community exposures and health outcomes. Despite the need for more research, some studies suggest that communities face health risks from poultry operation air pollution. For example, airborne contaminants from broiler operations are transported from broiler houses through large exhaust fans and may pose a health risk to nearby residents.^{16,18,25,31-36} In addition, ammonia,³⁷ particulate matter,²⁵ endotoxins,³⁵ and microorganisms^{16,18,25} have been detected in air samples surrounding poultry operations. While there are currently few data available on odor, nitrous oxide, hydrogen sulfide, and non-methane volatile organic compound levels surrounding poultry operations, odors associated with air pollutants from intensive livestock hog operations

have been shown to interfere with daily activities, quality of life, social gatherings, and community cohesion.^{29,33,38}

Exposure to airborne contaminants expelled from broiler operations has been associated with a range of adverse health effects. Ammonia emissions have been implicated in respiratory health issues, with up to 50% of poultry workers suffering from upper respiratory illnesses that are believed to be due to ammonia exposure.³¹ Studies have shown that endotoxin exposure can exacerbate pre-existing asthma or induce new cases of asthma, and exposure was found to be a significant predictor of chronic phlegm for poultry workers.^{33,39} Additionally, poultry workers demonstrated a high prevalence of obstructive pulmonary disorders, with increasing prevalence associated with longer exposure, regardless of smoking status.³⁴ Particulate matter—consisting mainly of down feathers, mineral crystals from urine, and poultry litter in broiler operations—may also have detrimental effects on human health, causing chronic cough and phlegm, chronic bronchitis, allergic reactions, asthma-like symptoms in farmers, and respiratory problems in people living in the vicinities of operations.³⁵

A 2010 USDA study measured volatile organic compounds (VOCs) inside industrial broiler operations and found that not only were ten classes of VOCs present, but that areas of the compound with birds had VOC levels seven fold higher than those without birds.⁴⁰ Exposure to VOCs is associated with short- and long-term adverse health effects, including nausea; headaches; eye, nose and throat irritation; and liver and kidney damage, while some are suspected or known to cause cancer.⁴¹ It is important to note that even industrial broiler operations that employ best management practices and mitigation techniques have been shown to generate airborne contaminants.³²

Contaminated ground and surface water

Based on manure production data from the American Society of Agricultural Engineers,⁴² 17 million broilers would produce an estimated 3,910,000 pounds of waste per day (0.23 lbs. per bird), or more than twice the equivalent amount of human waste generated daily by the entire city of Omaha, Nebraska's largest city. Although animal manure is an invaluable fertilizer, waste quantities of this magnitude - concentrated over a small geographic footprint - represent a public health and ecological hazard.

Manure from industrial poultry operations contain nutrients and may contain heavy metals, drug residues, and pathogens that can leach into groundwater or runoff into surface water.^{17,28,36,43,44} Studies have demonstrated that humans can be exposed to waterborne contaminants from livestock and poultry operations through the recreational use of contaminated surface water and the ingestion of contaminated drinking water.^{30,44} Furthermore, the disposal and decomposition

of diseased poultry carcasses may contaminate water sources and pose a threat to human health.²⁸

The nutrients nitrogen and phosphorus--naturally occurring in chicken manure--have been found in both ground and surface water near Maryland broiler chicken operations⁴⁵ and can have deleterious effects on water quality and human health.^{25,28,30,34,44,46-48} In one study, proximity to broiler chicken and corn production was associated with higher nitrate concentrations in drinking water in Maryland wells.⁴⁶ Ingesting high levels of nitrate has been associated with increased risks for thyroid conditions,^{30,49,50} birth defects and other reproductive problems,^{30,50,51} diabetes,^{30,50} various cancers,^{50,52} and methemoglobinemia (blue baby syndrome), a potentially fatal condition among infants.^{30,53} As stated previously, approximately 16% of Dodge County residents rely on private wells for drinking water,²⁷ so there is cause for concern regarding the spread of nitrate into groundwater that is used for drinking and other household uses and is not monitored by government agencies.

Nutrient runoff has also been implicated in the growth of harmful algal blooms,^{25,28,47} which may pose health risks for people who swim or fish in recreational waters, or who consume contaminated fish and shellfish. Exposure to algal toxins has been linked to neurological impairments, liver damage, gastrointestinal illness, severe dermatitis, and other adverse health effects.^{54,55} According to the Nebraska Department of Environmental Quality (NDEQ), water quality degradation is already a concern for sandpit lakes in the state.⁵⁶ These lakes, used for fishing, swimming, and other recreational activities, are affected by nutrient loading, especially phosphorus, leading to eutrophication.⁵⁶ Fremont Lake #20 near the city of Fremont is one of the lakes affected by nutrient runoff. Algal toxins discovered in the lake from 2005 to 2007 resulted in significant restrictions on recreational water use and monitoring of water quality during this period identified high concentrations of phosphorus and nitrogen as the cause of blue green algae blooms.⁵⁶ More recently, eight lakes in the Fremont State Lake System were identified as impaired by nutrients in the NDEQ 2012 Water Quality Integrated Report.⁵⁷ Introducing a poultry processing plant and waste from 17 million birds will likely exacerbate existing water quality issues, and introduce nutrient runoff to previously unaffected areas.

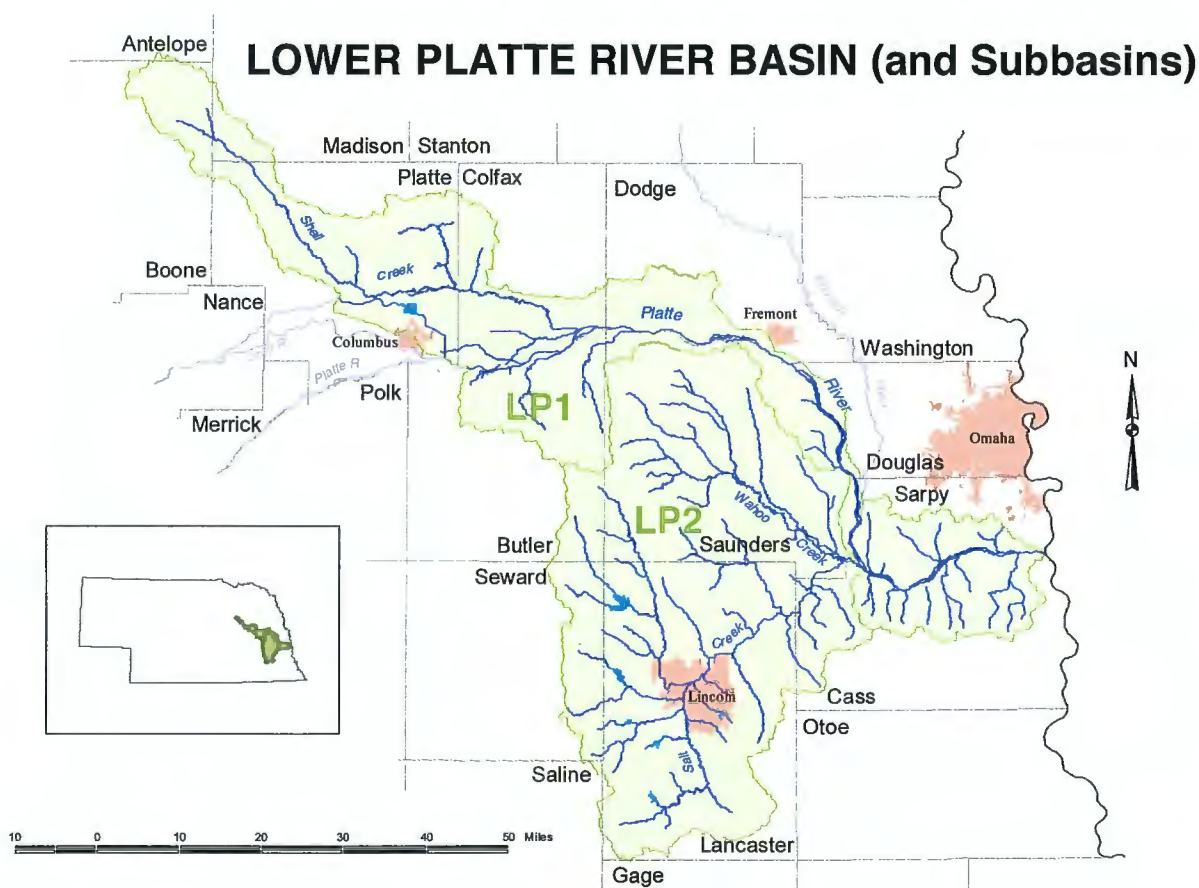
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Lower Platte River Basin – Hydrologic Units 10200201, 10200202 and 10200203

The Lower Platte River Basin includes 126 designated stream segments and 76 designated lakes/reservoirs.

Waterbody Type	Primary Contact Recreation	Aquatic Life CA ¹	Aquatic Life CB ¹	Aquatic Life WA ¹	Aquatic Life WB ¹	Water Supply – Public Drinking	Water Supply – Ag	Water Supply- Ind.	Aesthetics
Lakes	76	0	1	75	0	0	76	2	76
Streams	16	0	1	13	112	2	126	1	126

¹ CA = Coldwater Class A, CB = Coldwater Class B, WA = Warmwater Class A and WB = Warmwater Class B

Delisting/ Changes from 2016 IR

The following are waters and or parameters that were delisted – removed from category 5 or other significant changes from the 2016 Integrated Report (IR).

LP1-L0030: Louisville Lake No. 2 (SRA) – This waterbody was listed as category 2 in the 2016 IR. A Fish Consumption Assessment determined this waterbody’s Aquatic Life use is supporting. This waterbody will remain in category 2.

LP1-L0060: Jenny Newman Lake (Platte River State Park) – This waterbody was listed as category 5 in the 2016 IR. This waterbody’s Aquatic Life use was impaired for Chlorophyll α and Total Phosphorus.

New data gathered in 2015/2016 determined this waterbody's Aquatic Life use is impaired for pH. This waterbody will remain in category 5.

LPI-L0100: Two Rivers Lake No.5 (SRA) – This waterbody was listed as category 2 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LPI-L0180: Fremont Lake No. 12 (SRA) – This waterbody was listed as category 2 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting. Water quality data gathered in 2013/2014 determined the Recreational use is supporting for Microcystin, and the Aquatic Life use is impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. This waterbody will be placed in category 5.

LPI-L0200: Fremont Lake No. 15 (Victory) (SRA) – This waterbody was listed as category 2 in the 2016 IR. Fish tissue data gathered in 2015 determined the Aquatic Life use is supporting. Water quality data gathered in 2013/2014 determined the Recreational use is supporting for Microcystin, and the Aquatic Life use is impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. This waterbody will be placed in category 5.

LPI-L0210: Fremont Lake No. 11 (SRA) – This waterbody was listed as category 3 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LPI-L0220: Fremont Lake No. 18E (SRA) – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Chlorophyll a. Data gathered in 2015/2016 determined the Recreational use is supporting for Microcystin, and the Aquatic Life use is impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. This waterbody will remain in category 5.

LPI-L0240: Fremont Lake No. 10 (SRA) – This waterbody was listed as category 2 in the 2016 IR. Data gathered in 2015/2016 determined this waterbody's Aquatic Life use is impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. This waterbody will be placed in category 5.

LPI-L0270: Fremont Lake No. 16 (SRA) – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Chlorophyll a, and pH. New data determined the Aquatic Life use is impaired for Total Phosphorus. This waterbody will remain in category 5.

LPI-L0280: Fremont Lake No. 9 (SRA) – This waterbody was listed as category 2 in the 2016 IR. New data determined the Aquatic Life use is impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. This waterbody will be placed in category 5.

LPI-L0290: Fremont Lake No. 1 (SRA) – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Phosphorus, Hazard Index Compounds, and Mercury. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds and impaired for Total Nitrogen. This waterbody will remain in category 5.

LPI-L0300: Fremont Lake No. 2 (SRA) – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, and pH. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting. This waterbody will remain in category 5.

LPI-L0320: Fremont Lake No. 5 (SRA) – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, Dissolved Oxygen, and pH. New data determined the Aquatic Life use is supporting for Dissolved Oxygen. This waterbody will remain in category 5.

LP1-L0330: Fremont Lake No. 4 (SRA) – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Chlorophyll a, and pH. New data determined the Aquatic Life use is impaired for Total Phosphorus. This waterbody will be placed in category 4A.

LP1-L0355: Homestead Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will remain in category 5.

LP1-L0370: Schuyler City Lake (South Park Lake) – This waterbody was listed as category 4R in the 2016 IR. This waterbody's Aesthetics use was impaired for Algae Blooms. The lake was renovated in 2006 and will be targeted for reassessment in 2018.

LP1-L0450: Lake Babcock – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Recreational use was impaired for *E. coli* bacteria. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will remain in category 5.

LP2-L0010: Memphis Lake (SRA) – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Mercury. New data determined the Agricultural Water Supply use is supporting. This waterbody will remain in category 5.

LP2-L0015: Lake Wanahoo – This waterbody was listed as category 3 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LP2-L0020: Hedgefield Lake (WMA) – This waterbody was listed as category 3 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LP2-L0030: Wagon Train Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, Dissolved Oxygen, Hazard Index Compounds, and Mercury. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds and Mercury. New water quality data determined the Aquatic Life use is supporting for Dissolved Oxygen. This waterbody will remain in category 5.

LP2-L0040: Holmes Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, pH, Hazard Index Compounds, and Mercury. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds. This waterbody will remain in category 5.

LP2-L0050: Stagecoach Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, Hazard Index compounds, and Mercury. The Aesthetics use was impaired for Sediment. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds and Mercury. This waterbody will remain in category 5.

LP2-L0070: Cottontail Lake (17A) – This waterbody was listed as category 2 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LP2-L0090: Yankee Hill Lake – This waterbody was listed as category 4R in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, and pH. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury.

Nutrient data gathered in 2015/2016 determined the Aquatic Life use is still impaired for Total Nitrogen and Total Phosphorus. This waterbody will be placed in category 5.

LP2-L0100: Bowling Lake – This waterbody was listed as category 4R in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be targeted for a nutrient reassessment in 2018. This waterbody will be placed in category 5.

LP2-L0110: Bluestem Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, Hazard Index Compounds, and Mercury. The aesthetics use was impaired for Sediment. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds and Mercury. New water quality data determined the Recreational use is impaired for *E. coli* bacteria. This waterbody will remain in category 5.

LP2-L0120: Wildwood Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, Dissolved Oxygen, Hazard Index Compounds, and Mercury. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds. This waterbody will remain in category 5.

LP2-L0140: Olive Creek Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, and pH. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. New water quality data determined the Aquatic Life use is impaired for Dissolved Oxygen. This waterbody will remain in category 5.

LP2-L0160: Pawnee Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. The aesthetics use was impaired for Sediment. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is now impaired for Mercury. This waterbody will remain in category 5.

LP2-L0170: Merganser Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Hazard Index Compounds and Mercury. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds. This waterbody will remain in category 5.

LP2-L0190: Red Cedar Lake – This waterbody was listed as category 2 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LP2-L0200: Wild Plum Lake (26A) – This waterbody was listed as category 2 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LP2-L0220: Meadowlark Lake – This waterbody was listed as category 4R in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, and Dissolved Oxygen. New water quality data determined the Recreational use is supporting. The Aquatic Life use is supporting for Dissolved oxygen, and impaired for Total Nitrogen, Total Phosphorus, and Chlorophyll a. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LP2-L0250: Timber Point Lake (6C) – This waterbody was listed as category 2 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury. This waterbody will be placed in category 5.

LP2-L0270: Czechland Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Nitrogen, Total Phosphorus, Chlorophyll a, and Ammonia. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds. This waterbody will remain in category 5.

LP2-L0280: Redtail Lake – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Total Phosphorus and Chlorophyll a. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is impaired for Mercury and supporting for Hazard Index Compounds. This waterbody will remain in category 5.

LP1-10000: Platte River – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Selenium and Hazard Index Compounds. The Selenium assessment methods were updated for the acute water quality standard to reflect EPA's priority toxic pollutants method of no more than one violation in the last 3 years. Chronic water quality standards were not able to be assessed against with the same dataset due to the states monitoring protocol which does not allow for the calculation of a 4 day average. Selenium is now supporting the Aquatic Life use. Data gathered in 2015 determined the Recreation use to be impaired for *E. coli* bacteria. Water quality data gathered by the United States Geological Survey determined the Aquatic Life, Public Drinking Water Supply, and Agricultural Water Supply uses are supporting. This waterbody will remain in category 5.

LP1-10100: Fourmile Creek – This waterbody was listed as category 2 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life use is supporting. This waterbody will be placed in category 1.

LP1-10900: Springfield Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP1-11000: Buffalo Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP1-11300: Fountain Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP1-11700: Western Sarpy Ditch – This waterbody was listed as category 3 in the 2016 IR. An Aquatic Community Assessment was completed, and determined the Aquatic Life and Aesthetics uses are supporting. This waterbody will be placed in category 2.

LP1-20000: Platte River – This waterbody was listed as category 4A in the 2016 IR. This waterbody's Recreational use was impaired for *E. coli* bacteria. Water quality data gathered by the United States Geological Survey determined the Aquatic Life and Agricultural Water Supply uses are supporting. Water quality data gathered in 2015 determined the Recreational use is supporting. This waterbody will be placed in category 1.

LP1-20400: Skull Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2016 determined the Aquatic Life and Agricultural Water Supply uses are supporting. An Aquatic Community Assessment was completed, and determined the Aquatic Life and Aesthetic uses are supporting. This waterbody will be placed in category 1.

LP1-20620: Loseke Creek – This waterbody was listed as category 3 in the 2016 IR. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP1-20630: Loseke Creek – This waterbody was listed as category 3 in the 2016 IR. An Aquatic Community Assessment was completed, and determined the Aquatic Life and Aesthetics uses are supporting. This waterbody will be placed in category 2.

LP1-20700: Shell Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Atrazine and Selenium. The Selenium assessment methods were updated for the acute water quality standard to reflect EPA's priority toxic pollutants method of no more than one violation in the last 3 years. Chronic water quality standards were not able to be assessed against with the same dataset due to the states monitoring protocol which does not allow for the calculation of a 4 day average. Selenium is now supporting the Aquatic Life use. Water quality data gathered in 2015 determined the Aquatic Life use is supporting. Data gathered by the United States Geological Survey confirmed both the Aquatic Life and Agricultural Water Supply uses to be supporting. This waterbody will be placed in category 1.

LP1-20720: Elm Creek – This waterbody was listed as category 3 in the 2016 IR. An Aquatic Community Assessment was completed, and determined the Aquatic Life and Aesthetics uses are supporting. This waterbody will be placed in category 2.

LP1-20800: Shell Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Aquatic Community due to an unknown pollutant. Water quality data gathered in 2015 determined the Aquatic Life, Aesthetics, and Agricultural Water Supply uses are supporting. This waterbody will remain in category 5.

LP1-21000: Lost Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP1-21300: Bone Creek – This waterbody was listed as category 2 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will remain in category 2.

LP1-SXXX1: Unnamed Creek – This waterbody was not listed in the 2016 IR. This waterbody was given a unique ID. An Aquatic Community Assessment was completed, and determined the Aquatic Life use is impaired for Aquatic Community due to an unknown pollutant. This waterbody will be placed in category 5.

LP2-10000: Salt Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Recreational use was impaired for *E. coli* bacteria, and the Aquatic Life use was impaired for Selenium. The Selenium assessment methods were updated for the acute water quality standard to reflect EPA's priority toxic pollutants method of no more than one violation in the last 3 years. Chronic water quality standards were not able to be assessed against with the same dataset due to the states monitoring protocol which does not allow for the calculation of a 4 day average. Selenium is now supporting the Aquatic Life use. The Agricultural Water Supply Class B reporting was removed due to no criteria. Data gathered by the United States Geological Survey confirmed the Aquatic Life use to be supporting. This waterbody will be placed in category 4a.

LP2-10100: Wahoo Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Recreation use was impaired for *E. coli* bacteria, and the Aquatic Life use was impaired for Selenium. The Selenium assessment methods were updated for the acute water quality standard to reflect EPA's priority toxic pollutants method of no more than one violation in the last 3 years. Chronic water quality standards were not able to be assessed against with the same dataset due to the states monitoring protocol which does not allow for the calculation of a 4 day average. Selenium is now supporting the Aquatic Life use. This waterbody will be placed in category 4a.

LP2-10111: Silver Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. An Aquatic Community assessment completed in 2015 determined the Aesthetics use to be supporting and confirmed the Aquatic Life use to be supporting. This waterbody will be placed in category 1.

LP2-10120: Clear Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2016 determined the Aquatic Life use is impaired for Ammonia and the Agricultural Water Supply use is supporting. This waterbody will be placed in category 5.

LP2-10130: Clear Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP2-10140: Silver Creek – This waterbody was listed as category 2 in the 2016 IR. An Aquatic Community Assessment was completed, and determined the Aquatic Life use is impaired for Aquatic Community based on an unknown pollutant. New water quality data determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 5.

LP2-10150: Mosquito Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP2-10160: Sand Creek – This waterbody was listed as category 2 in the 2016 IR. Water quality data gathered in 2016 determined the Agricultural Water Supply use is supporting, and the Aquatic Life use is impaired for Atrazine. This waterbody will be placed in category 5.

LP2-10180: Sand Creek – This waterbody was listed as category 3 in the 2016 IR. An Aquatic Community Assessment was completed, and determined the Aquatic Life and Aesthetics uses are supporting. This waterbody will be placed in category 2.

LP2-10210: Cottonwood Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Aquatic Community due to an unknown pollutant. Water quality data gathered in 2015/2016 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will remain in category 5.

LP2-10220: Miller Branch – This waterbody was listed as category 2 in the 2016 IR. Water quality data gathered in 2016 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 1.

LP2-10231: Unnnamed Creek – This waterbody was listed as category 3 in the 2016 IR. An Aquatic Community Assessment was completed, and determined the Aquatic Life and Aesthetics uses are supporting. This waterbody will be placed in category 2.

LP2-10300: Wahoo Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP2-20000: Salt Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Recreational use was impaired for *E. coli* bacteria. The Aquatic Life use was impaired for Hazard Index Compounds and Aquatic Community based on an unknown pollutant. The Agricultural Water Supply Class B reporting was removed due to no criteria. An Aquatic Community Assessment was completed, and determined the Aquatic Life use is supporting for Aquatic Community. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds. Data gathered by the United States Geological Survey determined the Aquatic Life use is impaired for Aluminum. This waterbody will remain in category 5.

LP2-20200: Stevens Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP2-20300: Little Salt Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Copper, Selenium, Ammonia, and Aquatic Community based on an unknown pollutant. The Selenium assessment methods were updated for the acute water quality standard to reflect EPA's priority toxic pollutants method of no more than one violation in the last 3 years. Chronic water quality standards were not able to be assessed against with the same dataset due to the states monitoring protocol which does not allow for the calculation of a 4 day average. Selenium is now supporting the Aquatic Life use. The Agricultural Water Supply Class B reporting was removed due to no criteria. This waterbody will remain in category 5.

LP2-20500: Oak Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Recreational use was impaired for *E. coli* bacteria. The Aquatic Life use was impaired for Chloride and Hazard Index Compounds. A Fish Consumption Assessment determined this waterbody's Aquatic Life use is supporting for Hazard Index Compounds and impaired for Mercury. The Agricultural Water Supply Class B reporting was removed due to no criteria.

LP2-20510: Elk Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP2-20900: Antelope Creek – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Recreational use was impaired for *E. coli* bacteria. The Aquatic Life use was impaired for Selenium and Copper. Water quality data gathered in 2015 determined the Recreational use is supporting for *E. coli*. The Agricultural Water Supply Class B reporting was removed due to no criteria. The Selenium assessment methods were updated for the acute water quality standard to reflect EPA's priority toxic pollutants method of no more than one violation in the last 3 years. Chronic water quality standards were not able to be assessed against with the same dataset due to the states monitoring protocol which does not allow for the calculation of a 4 day average. Selenium is now supporting the Aquatic Life use. This waterbody will remain in category 5.

LP2-21200: Haines Branch – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Aesthetics uses are supporting. The Agricultural Water Supply Class B reporting was removed due to no criteria.

LP2-40000: Salt Creek – This waterbody was listed as category 3 in the 2016 IR. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will be placed in category 2.

LP2-40300: Olive Branch – This waterbody was listed as category 5 in the 2016 IR. This waterbody's Aquatic Life use was impaired for Aquatic Community based on an unknown pollutant. Water quality data gathered in 2015 determined the Aquatic Life and Agricultural Water Supply uses are supporting. This waterbody will remain in category 5.

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Action
L0010	Louisville Lake No. 1 (SRA)	S	NA		NA		NA	S	2		Fish Consumption Assessment completed
L0020	Louisville Lake No. 1A (SRA)	NA	S		NA		NA	S	2		
L0030	Louisville Lake No. 2 (SRA)	S	S		NA		S	S	2		Fish Consumption Assessment completed
L0040	Louisville Lake No. 3 (SRA)	S	NA		NA		NA	S	2		
L0050	Louisville Lake No. 2A (SRA)	S	NA		NA		NA	S	2		
L0060	Jenny Newman Lake (Platte River State Park)	NA	I		NA		NA	I	5	Aquatic Life - Chlorophyll α , pH (Total Phosphorus)	
L0070	Schramm Park Ponds (10 Ponds) (SRA)	NA	NA		NA		NA	NA	3		
L0080	Qwest Lake (Mahoney State Park)	S	NA		NA		NA	S	2		Name changed from U.S. Qwest Lake in
L0090	Baright Lake (Mahoney State Park)	S	NA		NA		NA	S	2		Name changed from Owest Lake to Baright Lake
L0100	Two Rivers Lake No. 5 (SRA)	S	S		NA		NA	S	2		Fish Consumption Assessment completed

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/History
1-L0110	Two Rivers Carp Lake (SRA)	NA	NA		NA		NA	NA	3		
1-L0120	Two Rivers Lake No. 6 (SRA)	S	NA		NA		NA	S	2		
1-L0130	Two Rivers Lake No. 1 and 2 (SRA)	S	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption complete
1-L0140	Two Rivers Lake No. 3 (SRA)	S	NA		NA		NA	S	2		
1-L0150	Two Rivers Lake No. 4 (SRA)	S	NA		NA		S	S	2		
1-L0160	Fremont Lake No. 14 (SRA)	NA	NA		NA		NA	NA	3		
1-L0170	Fremont Lake No. 13 (SRA)	NA	NA		NA		NA	NA	3		
1-L0180	Fremont Lake No. 12 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)	Fish Consumption complete
1-L0190	Fremont Lake No. 19 (SRA)	NA	NA		NA		NA	NA	3		
1-L0200	Fremont Lake No. 15 (Victory) (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)	Fish Consumption complete

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Action
L0210	Fremont Lake No. 11 (SRA)	NA	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption Assessment completed
L0220	Fremont Lake No. 18E (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)	
L0230	Fremont Lake No. 17 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL to Phosphorous, Chlorophyll approved 1/
L0240	Fremont Lake No. 10 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)	Fish Consumption Assessment completed
L0250	Fremont Lake No. 20 (SRA)	S	I		S		S	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL to Toxins approved 9/ Consumption Assessment
L0270	Fremont Lake No. 16 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL Chlorophyll α & pH approved
L0280	Fremont Lake No. 9 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)	
L0290	Fremont Lake No. 1 (SRA)	S	I		S		S	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL to Phosphorous, Chlorophyll and pH approved Consumption Assessment

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Notes
1-L0300	Fremont Lake No. 2 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL to be approved 1/13, Fish Assessment completed
1-L0310	Fremont Lake No. 3 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α , Dissolved Oxygen (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL to be approved, Chlorophyll assessment completed
1-L0315	Fremont Lake No. 3A (SRA)	NA	NA		NA		NA	NA	3		
1-L0320	Fremont Lake No. 5 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL to be approved, Chlorophyll assessment completed
1-L0330	Fremont Lake No. 4 (SRA)	S	I		S		S	I	4a	Aquatic Life - Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL to be approved, Chlorophyll assessment completed
1-L0340	Fremont Lake No. 6 (SRA)	NA	NA		NA		NA	NA	3		
1-L0350	Fremont Lake No. 7 and 8 (SRA)	S	I		S		S	I	5	Aquatic Life - Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL to be approved, Chlorophyll assessment completed

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Action
L0355	Homestead Lake	S	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α (Total Nitrogen, Total Phosphorus)	Fish Consumption Advisory completed
L0360	Schuyler East Park Pond	NA	NA		NA		NA	NA	3		
L0370	Schuyler City Lake (South Park Lake)	NA	NA		NA		I	I	4r	Aesthetics - Algae Blooms (Unknown)	TN and TP not assessed, renovated in 2006 and v for reassessment
L0380	Camp Luther Pond	NA	NA		NA		NA	NA	3		
L0390	McAllister Lake	NA	NA		NA		NA	NA	3		
L0400	Christopher Cove Lake	NA	NA		NA		NA	NA	3		
L0410	Country Club Shores Lake	NA	NA		NA		NA	NA	3		
L0420	Columbus Country Club Lake	NA	NA		NA		NA	NA	3		
L0430	Oconee Siphon Pond	NA	NA		NA		NA	NA	3		

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Notes
1-L0440	Lake North	S	I		S	S	S	I	5	Aquatic Life - Chlorophyll α , pH (Total Phosphorus)	Fish Consumption complete
1-L0450	Lake Babcock	I	I		NA	S	S	I	5	Recreation (<i>E. coli</i>), Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption complete
2-L0010	Memphis Lake (SRA)	S	I		S		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption complete
2-L0015	Lake Wanahoo	NA	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	New lake built in Consumption Assessment
2-L0020	Hedgefield Lake (WMA)	NA	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption complete
2-L0030	Wagon Train Lake	S	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL & Dissolved Sediment TMDLs approved Lake Renovated Consumption Assessment
2-L0040	Holmes Lake	S	I		S		S	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorous TMDL & Dissolved Sediment TMDLs approved 2005, Fish Consumption Assessment complete

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Additional Information
L-0050	Stagemoach Lake	S	I		S		I	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus), Aesthetics (Sediment)	Fish Consumption / complete
L-0060	Oak Lake	NA	I		NA		S	I	5	Aquatic Life - Dissolved Oxygen (Unknown), (Natural Chlorides)	TN and TP not assessed natural. Fish Consumption / complete
L-0065	Regional Center Pond	NA	NA		NA		NA	NA	3		
L-0070	Cottontail Lake (17A)	S	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption / complete
L-0080	Killdeer Lake (WMA)	NA	S		NA		NA	S	2		Fish Consumption / complete
L-0090	Yankee Hill Lake	S	I		S		S	I	5	Aquatic Life - Fish Tissue Advisory (Mercury), Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Phosphorus TMDL to Phosphorus and Sediment approved 9/02, Lake to be reassessed in 2006 and reassessed in Consumption Assessment
L-0100	Bowling Lake	NA	I		NA		S	I	5	Aquatic Life - Fish Tissue Advisory (Mercury), Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Sediment TMDL approved in 2006 and reassessed in Consumption Assessment

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Notes
22-L0110	Bluestem Lake	I	I		S		I	I	5	Recreation (<i>E. coli</i>), Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus), Aesthetics (Sediment)	Fish Consumption completed
22-L0120	Wildwood Lake	S	I		S		S	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α , Dissolved Oxygen (Total Nitrogen, Total Phosphorus)	Lake Renovated Consumption Assessment
22-L0130	Conestoga Lake	S	I		S		I	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus), Aesthetics (Sediment)	Fish Consumption completed, Lake renovation as
22-L0140	Olive Creek Lake	S	I		S		S	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α , pH, Dissolved Oxygen (Total Nitrogen, Total Phosphorus)	Fish Consumption completed
22-L0150	Branched Oak Lake	S	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)	Fish Consumption completed
22-L0160	Pawnee Lake	S	I		S		I	I	5	Aquatic Life - Fish Tissue Advisory (Mercury), Chlorophyll α (Total Nitrogen, Total Phosphorus), Aesthetics (Sediment)	Sediment TMDL application Consumption Assessment
22-L0170	Merganser Lake (25A)	NA	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption completed

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Action
L0180	Teal Lake (27C)	NA	NA		NA		NA	NA	3		
L0190	Red Cedar Lake	S	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption Assessment completed
L0200	Wild Plum Lake (26A)	S	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption Assessment completed
L0210	Tanglewood Lake (27C)	NA	NA		NA		NA	NA	3		
L0220	Meadowlark Lake	S	I		S		S	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α (Total Nitrogen, Total Phosphorus)	Lake renovated 2017. Consumption Assessment completed
L0230	Twin Lakes WMA Pond	NA	NA		NA		NA	NA	3		
L0240	East Twin Lake	S	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)	Fish Consumption Assessment completed
L0250	Timber Point Lake (6C)	S	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury)	Fish Consumption Assessment completed
L0260	West Twin Lake	NA	I		S		S	I	5	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus), (Ammonia)	

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/
2-10270	Czechland Lake	NA	I		S		S	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α , pH (Total Nitrogen, Total Phosphorus)	Fish Consumption complete
2-10280	Redtail Lake	NA	I		NA		NA	I	5	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α (Total Phosphorus)	Fish Consumption complete

reams

1-10000	Platte River	I	I	S	S		S	I	5	Recreation (<i>E. coli</i>), Aquatic Life - Fish Consumption Advisory (Hazard Index Compounds*)	E. coli TMDL approved Consumption Assessment
1-10100	Fournile Creek		S		S		S	S	1		Aquatic Community complete
1-10110	Eightmile Creek		S		NA		S	S	2		Aquatic Community complete
1-10111	Bachelor Branch		NA		NA		NA	NA	3		
1-10200	Fournile Creek		S		NA		S	S	2		Aquatic Community complete
1-10210	Unnamed Creek		NA		NA		NA	NA	3		

Waterbody ID	Waterbody Name	2018 IR							Comments/Action
		Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	
10300	Fourmile Creek		NA		NA		NA	NA	3
10400	Zwiebel Creek		NA		NA		NA	NA	3
10410	Unnamed Creek		NA		NA		NA	NA	3
10500	Zwiebel Creek		NA		NA		NA	NA	3
10600	Turkey Creek		NA		NA		NA	NA	3
10700	Cedar Creek		NA		NA		NA	NA	3
10710	Unnamed Creek		NA		NA		NA	NA	3
10800	Cedar Creek		NA		NA		NA	NA	3
10900	Springfield Creek		S		S		NA	S	2
11000	Buffalo Creek		S		S		NA	S	2

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Issues
1-111100	Mill Creek		NA		NA		NA	NA	3		
1-11200	Decker Creek	I	S		S		S	I	5	Recreation (<i>E. coli</i>)	Aquatic Community complete
1-11300	Fountain Creek		S		S		NA	S	2		
1-11400	Unnamed Creek		NA		NA		NA	NA	3		
1-11500	Pawnee Creek		S		NA		S	S	2		Aquatic Community complete
1-11510	West Branch Pawnee Creek		NA		NA		NA	NA	3		
1-11600	Pawnee Creek		S		NA		S	S	2		Aquatic Community complete
1-11700	Western Saryp Ditch		S		NA		S	S	2		Aquatic Community complete
1-20000	Platte River	S	S	S	S		S	S	1		E. coli TMDL approach Consumption Assessment
1-20100	Clear Creek		NA		NA		NA	NA	3		
1-20110	Upper Clear Creek		NA		NA		NA	NA	3		

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Additional Information
20200	Clear Creek		NA		NA		NA	NA	3		
20300	Otoe Creek		NA		NA		NA	NA	3		
20400	Skull Creek		S		S		S	S	1		Aquatic Community completed
20410	Unnamed Creek		NA		NA		NA	NA	3		
20500	Skull Creek		NA		NA		NA	NA	3		
20600	Shell Creek	I	S		S		S	I	5	Recreation (<i>E. coli</i>)	
20610	Taylor Creek		NA		NA		NA	NA	3		
20620	Loseke Creek		S		S		NA	S	2		Fish Consumption / completed
20621	Schaad Creek		NA		NA		NA	NA	3		
P1-621.1	Unnamed Creek		NA		NA		NA	NA	3		
20630	Loseke Creek		S		NA		S	S	2		Aquatic Community completed

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Notes
1-20631	Unnamed Creek		NA		NA		NA	NA	3		
1-20640	Loseke Creek		S		NA		S	S	2		Aquatic Community complete
1-20700	Shell Creek		S		S		S	S	1		Atrazine TMDL at
1-20710	Unnamed Creek		NA		NA		NA	NA	3		
1-20720	Elm Creek		S		NA		S	S	2		Aquatic Community complete
1-20800	Shell Creek		I		S		NA	I	5	Aquatic Life - Impaired Aquatic Community (Unknown)	Aquatic Community complete
1-20810	North Shell Creek		NA		NA		NA	NA	3		
1-20900	Shell Creek		NA		NA		NA	NA	3		
1-21000	Lost Creek		S		S		NA	S	2		
1-21010	Shonka Ditch		S		NA		NA	S	2		

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Additional Information
21100	Lost Creek		S		NA		S	S	2		Aquatic Community completed
21200	Lost Creek		NA		NA		NA	NA	3		
21300	Bone Creek		S		S		NA	S	2		
21310	Unnamed Creek		NA		NA		NA	NA	3		
21400	Bone Creek		S		NA		S	S	2		Aquatic Community completed
21500	Unnamed Creek		NA		NA		NA	NA	3		
21600	Deer Creek		NA		NA		NA	NA	3		
21700	Unnamed Creek		NA		NA		NA	NA	3		
21800	Loup River Canal	S	S		NA	S	S	S	2		Fish Consumption / Aquatic Community completed
P1-XX1	Unnamed Creek		I				S	I	5	Aquatic Life - Impaired Aquatic Community (Unknown)	Aquatic Community completed

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Notes
2-10000	Salt Creek	I	S				S	I	4a	Recreation (<i>E. coli</i>)	E. coli TMDL approved Consumption Assessment
2-10100	Wahoo Creek	I	S		S		S	I	4a	Recreation (<i>E. coli</i>)	E. coli TMDL approved community & Fish Assessment completed
2-10110	Clear Creek	I	S		S		S	I	5	Recreation (<i>E. coli</i>)	Aquatic Community completed
2-10111	Silver Creek		S		S		S	S	1		Aquatic Community completed
2-10120	Clear Creek		I		S		NA	I	5	Aquatic Life (Ammonia)	
2-10121	Johnson Creek		I		NA		NA	I	5	Aquatic Life - Impaired Aquatic Community (Unknown), (May-June Atrazine)	Aquatic Community completed
2-10130	Clear Creek		S		S		NA	S	2		
2-10140	Silver Creek		I		S		S	I	5	Aquatic Life - Impaired Aquatic Community (Unknown)	Aquatic Community completed
2-10150	Mosquito Creek		S		S		NA	S	2		

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Action
-10160	Sand Creek		I		S		S	I	5	Aquatic Life (May-June Atrazine)	Aquatic Community complete
-10161	Duck Creek		S		S		S	S	1		Aquatic Community complete
-10170	Sand Creek		S		S		S	S	1		Aquatic Community complete
-10171	Spring Creek		NA		NA		NA	NA	3		
-10180	Sand Creek		S		NA		S	S	2		Aquatic Community complete
-10200	Wahoo Creek		S		S		NA	S	2		
-10210	Cottonwood Creek		I		S		NA	I	5	Aquatic Life - Impaired Aquatic Community (Unknown)	Aquatic Community complete
-10211	Unnamed Creek		S		NA		S	S	2		Aquatic Community complete
-10220	Miller Branch		S		S		S	S	1		Aquatic Community complete
-10230	North Fork Wahoo Creek		S		S		NA	S	2		
-10231	Unnamed Creek		S		NA		S	S	2		Aquatic Community complete

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Notes
2-10240	North Fork Wahoo Creek		NA		NA		NA	NA	3		
2-10300	Wahoo Creek		S		S		NA	S	2		
2-10310	Dunlap Creek		NA		NA		NA	NA	3		
2-10400	Wahoo Creek		S		NA		S	S	2		Aquatic Community completed
2-10500	Callahan Creek		I		NA		NA	I	4c	Aquatic Life - Iron (Naturally Elevated)	
2-10600	Robinson Creek		I		NA		NA	I	4c	Aquatic Life - Iron (Naturally Elevated)	
2-10700	Greenwood Creek		I		NA		NA	I	4c	Aquatic Life - Iron (Naturally Elevated)	
2-10800	Dee Creek		I		NA		S	I	4c	Aquatic Life - Iron (Naturally Elevated)	Aquatic Community completed
2-10900	Camp Creek		I		NA		S	I	4c	Aquatic Life - Iron (Naturally Elevated)	Aquatic Community completed
2-11000	Rock Creek		I		S		S	I	4c	Aquatic Life - Iron (Naturally Elevated)	Fish Consumption completed, Aquatic Assessment completed

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Additional Information
-11010	North Fork Rock Creek		I		NA		S	I	4c	Aquatic Life - Iron (Naturally Elevated)	Aquatic Community complete
-11100	Rock Creek		S		NA		S	S	2		Aquatic Community complete
-11110	Ash Hollow Creek		NA		NA		NA	NA	3		
-11120	Little Rock Creek		NA		NA		NA	NA	3		
-11200	Rock Creek		NA		NA		NA	NA	3		
-20000	Salt Creek	I	I				S	I	5	Recreation (E. coli), Aquatic Life (Aluminum)	E. coli TMDL approved Community Assessment / Fish Consumption / complete
-20100	Jordan Creek		NA		NA		NA	NA	3		
-20200	Stevens Creek		S		S		NA	S	2		
-20300	Little Salt Creek		I				S	I	5	Aquatic Life - Impaired Aquatic Community (Unknown), (Copper, Ammonia)	Aquatic Community complete

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Assessments
2-20400	Dead Man's Run	I	I		S		S	I	5	Recreation (E. coli), Aquatic Life - Dissolved Oxygen (Unknown), pH (Naturally Elevated)	E. coli TMDL approved
2-20500	Oak Creek	I	I				S	I	5	Recreation (E. coli), Aquatic Life - Fish Consumption Advisory (Mercury), (Chloride)	E. coli TMDL approved Consumption Assessment
2-20510	Elk Creek		S		S		NA	S	2		
2-20511	West Oak Creek		NA		NA		NA	NA	3		
2-20520	Elk Creek		NA		NA		NA	NA	3		
2-20600	Oak Creek	I	I		S		S	I	5	Recreation (E. coli), Aquatic Life - Impaired Aquatic Community (Unknown)	Aquatic Community complete
2-20610	North Oak Creek		S		NA		S	S	2		Aquatic Community complete
2-20611	Wagon Tongue Creek		NA		NA		NA	NA	3		
2-20612	Bates Branch		S		NA		S	S	2		Aquatic Community complete

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/Additional Information
20700	Oak Creek		S		NA		S	S	2		Aquatic Community completed
20710	Middle Oak Creek		I		S		S	I	5	Aquatic Life (May-June Atrazine)	Aquatic Community completed
20800	Oak Creek		I		S		S	I	5	Aquatic Life (May-June Atrazine)	
20900	Antelope Creek	S	I				S	I	5	Aquatic Life (Copper)	E. coli and Ammonia approved 9/2018
21000	Middle Creek		S		S		S	S	1		Aquatic Community completed
21010	South Branch Middle Creek		NA		NA		NA	NA	3		
21200	Middle Creek		I		S		S	I	4a	Aquatic Life (May-June Atrazine)	Atrazine TMDL approved 9/2018
21210	Haines Branch		S				NA	S	2		
21210	Holmes Creek		S		S		S	S	1		
21300	Haines Branch		NA		NA		NA	NA	3		
21310	Cheese Creek		NA		NA		NA	NA	3		

Waterbody ID	Waterbody Name	Recreation	Aquatic Life	Public Drinking Water Supply	Agriculture Water Supply	Industrial Water Supply	Aesthetics	Overall Assessment	2018 IR	Impairments (Causes)	Comments/
2-21400	Haines Branch		NA		NA		NA	NA	3		
2-21500	Beal Slough	I	S		S		S	I	5	Recreation (<i>E. coli</i>)	
2-30000	Salt Creek	I	I		S		S	I	5	Recreation (<i>E. coli</i>), Aquatic Life - Impaired Aquatic Community (Unknown)	E. coli TMDL appropriate Consumption Assessment Aquatic Community complete
2-30100	Cardwell Branch	I	NA		NA		NA	I	5	Recreation (<i>E. coli</i>)	Aquatic Community complete
2-30200	Hickman Branch		S		NA		S	S	2		Aquatic Community complete
2-40000	Salt Creek		S		S		NA	S	2		
2-40100	Wittstruck Creek		NA		NA		NA	NA	3		
2-40200	Spring Branch		NA		NA		NA	NA	3		
2-40300	Olive Branch		I		S		NA	I	5	Aquatic Life - Impaired Aquatic Community (Unknown)	Aquatic Community complete
2-40310	North Branch		S		NA		S	S	2		Aquatic Community complete

er risk compounds-Aroclor-1248 (PCB-1248), Aroclor-1254 (PCB-1254), Aroclor-1260 (PCB-1260), cis-chlordane, Chlordane, trans-chlordane, DDE, DDT, Dieldrin, Heptachlor, Heptachlor Epoxide, Hexachlorobenzene, cis-nonachlor, trans-nonachlor, Oxychlordane, Pentachloroanisole, Trifluralin
nd index compounds- Aroclor-1254 (PCB-1254), Lindane (γ-BHC), cis-chlordane, Chlordane, trans-chlordane, DDT, Dieldrin, Heptachlor, Heptachlor

de, Hexachlorobenzene, cis-nonachlor, trans-nonachlor, Oxychlordane, Pentachloroanisole, Trifluralin, Mercury, Cadmium, Selenium

designates in Title 117 an undesignated waterbody. See Title 117 Chapter 2.004.

Animal Operations and Residential Property Values

by John A. Kilpatrick, PhD, MAI

Animal operations (AOs) may be broadly defined as facilities in which animals are raised or brought for slaughter. The common denominator is a large perpetual inventory and density of animals.¹

Although livestock and poultry production has more than doubled in the United States since the 1950s, the number of animal operations has decreased by 80%.² Food animal production in the United States has shifted to concentrated facilities where animals usually are raised in confinement. This concentration of animals brings environmental concerns related to air and water quality as well as animal and human health. As a result, animal operations are subject to regulation by the US Environmental Protection Agency (EPA), the US Department of Agriculture (USDA), and a variety of state entities. Laws and government regulations related to animal operations include specific definitions based on the function and size of the operations. For example, the EPA defines *animal feeding operations* (AFOs) as

agricultural enterprises where animals are kept and raised in confined situations. AFOs congregate animals, feed, manure and urine, dead animals, and production operations on a small land area. Feed is brought to the animals rather than the animals grazing or otherwise seeking feed in pastures, fields, or on rangeland.³

To qualify as an AFO, an animal operation must confine animals for at least 45 days in a twelve-month period.⁴ According to the EPA, there are approximately 450,000 AFOs in the United States.⁵ The EPA also designates certain AFOs as *concentrated animal feeding operations* (CAFOs) based on the confinement of large numbers of animals and the pollutant discharge. At CAFOs, there is a higher concentration of waste that increases the potential impact on air, water, and land quality.⁶ CAFOs are regulated by the EPA under the Clean Water Act,

FEATURES

Animal feeding and processing operations have grown more concentrated, with each facility handling much larger numbers of animals than traditional farms. The larger concentration of animals impacts the quality of surrounding air and water. In addition, the facilities impact the economic conditions of the communities where they are located. All of these factors can potentially affect the value of nearby houses. This article summarizes the current literature on how animal operations may affect the value of residential properties located near such facilities; this information will be useful to practicing appraisers faced with valuing houses in these communities.

1. Quite a few documents were reviewed to develop this discussion; see subsequent footnotes and Drew L. Kershen and Chuck Barlow, "Concentrated Animal Feeding Operations and Water, Air, Land, and Welfare," report on the American Bar Association (ABA) Special Committee on Agricultural Management Roundtable II on Environmental Challenges in Animal Feeding Operations (September 23, 1999).
2. EPA, *Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality* (EPA 820-R-13-002, July 2013), 3; <http://water.epa.gov/scitech/cec/upload/Literature-Review-of-Contaminants-in-Livestock-and-Poultry-Manure-and-Implications-for-Water-Quality.pdf>.
3. EPA, "What is a CAFO?", <http://www.epa.gov/region07/water/cafo/>.
4. Ibid.
5. EPA, "Animal Operations," <http://www.epa.gov/agriculture/anafoidx.html>.
6. http://www.epa.gov/region07/water/cafo/cafo_impact_environment.htm.

as environmental concerns arise when waste runoff is discharged onto adjacent landscapes and waterways.⁷

As the structure of the livestock industry has trended toward concentration of more animals in fewer operations, state and local governments also have acknowledged the problems associated with large operations by enacting legislation imposing stricter regulations on CAFOs and increasing separation distances.⁸ For example, in North Carolina the following mandatory setbacks are imposed on new or expanded farms with 250 or more hogs: 1,500 feet from occupied residences, 500 feet from any residential property boundary to swine houses and lagoons, and 75 feet from any residential property boundary to sprayfield boundaries.

Overall, the empirical evidence indicates that residences near AOs are significantly affected, and data seems to suggest a valuation impact of up to 26% for nearby properties, depending on distance, wind direction, and other factors. Further, there has been some suggestion that properties immediately abutting an AO can be diminished as much as 88%. One study estimates the total negative impact to property values in the United States at \$26 billion.⁹ Mitigation makes a marginal impact. Not only are residences affected, but nearby small farms can be impacted by such factors as water degradation and insects.

Environmental Impacts and Regulation of Animal Operations

AOs are generally recognized to affect the surrounding environment in several key ways: air quality and

odors (ammonia, hydrogen sulfide, methane, and particulate matter), greenhouse gas and climate change, insect vectors (often carrying resistant strains of pathogens), groundwater and surface water contamination, and a variety of pathogens.¹⁰

Data from the USDA and the EPA estimate that livestock in the United States produce 130 times the total amount of manure as the entire human population of the country. For example, one hog excretes nearly three gallons of waste per day or 2.5 times the average human's daily total. A 3,000-sow AO will produce about 25 tons of manure a day.¹¹ A similar number of chickens will produce about 700 pounds of manure per day (plus or minus 30%), containing about 9 pounds of nitrogen gas, 7.5 pounds of phosphorus pentoxide (a powerful irritant and corrosive) and over 4 pounds of potassium oxide, a highly reactive deliquescent that reacts violently with water to produce potassium hydroxide.¹² Manure from livestock production can contain bacteria (salmonella, *E. Coli* 0157:H7), parasites, viruses, and antimicrobials (antibiotics and vaccines).¹³ Excessive levels of phosphorus in land and water have been correlated with livestock density; and manure has caused eutrophication and degradation of US waterways.¹⁴

AOs are regarded as potential sources for contamination because of the large amounts of manure that they produce, and because the proximity in which the animals are confined allows for disease to be easily transferred.¹⁵ A 2006 outbreak of *E. coli* 0157:H7 was associated with the consumption of fresh spinach that had been in contact with water contaminated with animal feces.¹⁶ One of the

7. The USDA and EPA first regulated animal operations under the 1999 "Unified National Strategy for Animal Feeding Operations," see <http://water.epa.gov/polwaste/npdes/afo/Animal-Feeding-Operations-Regulations.cfm>. The USDA Economic Research Service presents a discussion of regulatory issues related to animal waste at <http://www.ers.usda.gov/topics/animal-products/animal-production-marketing-issues/policy-regulatory-issues.aspx#regulatory>. Up-to-date information on the Clean Water Act is available at <http://www2.epa.gov/laws-regulations>.

8. Joseph Herriges, Silvia Secchi, and Bruce A. Babcock, "Living with Hogs in Iowa: The Impact of Livestock Facilities on Rural Residential Property Values" (Iowa State University Center for Agricultural and Rural Development working paper, August 2003).

9. Doug Gurian-Sherman, *CAFOs Uncovered: The Untold Cost of Confined Animal Feeding Operations* (Cambridge, MA: Union of Concerned Scientists, 2008).

10. Carrie Hribar, *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities* (National Association of Local Boards of Health, 2010), available at http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf.

11. Don Hopey, "Study Finds Large Hog Farms Lower Property Values," *Post-Gazette* (June 7, 2003).

12. Jing Tao and Karen Mancel, "Estimating Manure Production, Storage Size, and Land Application Area," Ohio State University, 2008 Agricultural Fact Sheet. According to a study by the University of Wisconsin-Madison, the average chicken farm has 14,500 birds, with farm sizes ranging up to 50,000 birds; see UW-Madison College of Agricultural and Life Sciences, Center for Integrated Agricultural Systems, Research Brief 63, January 2003.

13. EPA, *Literature Review of Contaminants in Livestock and Poultry Manure*.

14. Stephen Jann, "Recent Developments in Water Pollution Control Strategies and Regulations," presentation at ABA Special Committee on Agricultural Management Roundtable II on Environmental Challenges in Animal Feeding Operations, Minneapolis, MN (May 12, 1999).

15. "National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs); Final Rule" *Federal Register* 68 (February 12, 2003). Note that portions of this were subsequently overturned in *Waterkeeper Alliance v. EPA*, 399 F.3d 486.

16. "FDA Finalizes Report on 2006 Spinach Outbreak," FDA (March 24, 2007), <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2007/ucm108873.htm>.

leading causes of food and waterborne illness in the United States is this *E. coli* O157:H7 organism, which is a specific strain of the *Escherichia coli* bacteria commonly found in the intestines of healthy cattle. One means of transfer of *E. coli* to humans occurs when untreated manure is able to enter water sources or used for fertilization.¹⁷ The EPA acting under the Clean Water Act has designated AFOs as point sources of pollution and requires that they have zero discharge or apply for a permit that requires an extensive waste management plan. Despite regulatory efforts to segregate manure-related contaminants from the water supply, contaminants still may enter the supply because of flooding, leeching into the soil, or through disregard of regulations.

In addition to water quality issues related to manure and waste run-off, animal operations facilities attract flies and other insects and parasites.¹⁸

As noted in Kilpatrick, state entities began regulating AFOs in the late 1990s.¹⁹ In 2000–2001, the EPA began levying fines against concentrated beef production facilities in the Northwestern United States that met two criteria: the facility confined animals for at least 45 non-consecutive days per year and the confinement area was devoid of vegetation. The rules generally applied to any operation with 300 head of cattle or more. At the time of the regulations, the EPA estimated that this would affect between 26,000 and 39,000 AFOs in the United States.²⁰

On December 11, 2002, the EPA issued its final revised regulations.²¹ The regulations affirmed the prior definitions of AFOs and CAFOs, provided for an explicit duty to apply for a permit, established required performance standards and best management practices, and explicitly required nutrient management plans.²²

Overview of AO Impacts on Property Values

An AO can affect the value of proximate properties in two ways. First, AOs have a substantial indirect negative economic impact on surrounding communities, including property values in those communities, via shifts in sources of purchases and other inputs in the factors of production. An early study by Chism and Levins reports that smaller farms make nearly 95% of their expenditures locally, while larger operations spend less than 20% locally.²³ Gomez and Zhang study 1,106 rural communities and conclude that economic growth rates in communities with conventional farming are 55% higher than in those with AOs.²⁴ They document the negative impact of AOs on the economy of the surrounding community, as revealed by sales tax receipts and reduced local purchases. They note that conventional farmers buy most or all of their supplies locally, thus stimulating the local community and, by extension, stimulating the local real estate market. On the other hand, AOs bypass local retailers and import the factors of production. Gomez and Zhang state that AOs exacerbate the economic negative impact by “importing” large quantities of pollution and the attendant costs; they also find AOs cause “disruption of local social and economic systems, pollution problems resulting from intensive agriculture, and negative impacts on the quality of life in rural communities.” This finding replicates those of an earlier study by Abeles-Allison and Connor, which showed AOs have the effect of crowding out more traditional farmers and decreasing purchases in local stores.²⁵

Hence, local communities suffer the negative economic byproducts without the attendant economic benefits.

17. “Disease Listing, *Escherichia coli* O157:H7, Gen Info,” Centers for Disease Control and Prevention, <http://www.cdc.gov/ecoli/>.

18. Stuart A. Smith, “Concentrated Animal Feeding Operations—Resources for Environmental Responsibility” (working paper prepared by Smith-Comeskey Ground Water Sciences, April 1, 2000); for additional information see <http://www.groundwaterscience.com/resources/tech-article-library/100-concentrated-animal-feeding-facilitiesresources-for-environmental-responsibility-.html>.

19. John A. Kilpatrick, “Concentrated Animal Feeding Operations and Proximate Property Values,” *The Appraisal Journal* (July 2001): 301–306.

20. Peggy Steward, “Cattlemen Find CAFO Rules Confusing,” *Capital Press Agricultural Weekly* (March 9, 2001): 9.

21. Claudia Copeland, “Animal Waste and Water Quality: EPA Regulation of Concentrated Animal Feeding Operations (CAFOs),” Congressional Research Service Report for Congress No 7-5700, February 16, 2010. The regulations were published in the *Federal Register* on February 12, 2003 and went into effect on April 14, 2003.

22. <http://water.epa.gov/polwaste/npdes/afo/>. Permitting is under the EPA’s National Pollutant Discharge Elimination System (NPDES) program, which regulates the discharge of pollutants from point sources; CAFOs are defined as point sources by the Clean Water Act.

23. John W. Chism and Richard A. Levins, “Farm Spending and Local Selling: How Do They Match Up?” *Minnesota Agricultural Economist* 676 (1994): 1–4.

24. Miguel Gomez and Liying Zhang, “Impacts of Concentration in Hog Production on Economic Growth in Rural Illinois” (Illinois State U. working paper presented at annual meeting of American Agricultural Economics Association, July 30–August 2, 2000).

25. M. Abeles-Allison and L. Connor, *An Analysis of Local Benefits and Costs of Michigan Hog Operations Experiencing Environmental Conflicts* (Agricultural Economic Report 536, Department of Agricultural Economics, Michigan State University monograph, 1990).

Second, AOs impact values at the individual residential value level. Property values are impacted as market participants view the AO as a negative externality. As an externality, it is not typically considered economically curable under generally accepted appraisal theory and practice. Hence, the value diminution attributable to proximate location of an AO can be attributed to stigma. The next section discusses case studies regarding the effects of AOs.

Proximity Case Studies

Kilpatrick presented a series of case studies from the 1990s that document the impacts of AOs.²⁶ For example, a Minnesota homeowner lived near two swine AOs when her family reportedly became ill and testing found that the level of hydrogen sulfide was well above the danger levels.²⁷ An early study in North Carolina by Schiffman et al. reports emotional impacts (tension, depression, anger, reduced vigor, fatigue, and confusion) linked to airborne contamination emanating from an AO.²⁸ A later North Carolina study by Wing and Wolf reports increased incidences of headache, runny nose, sore throat, excessive coughing, diarrhea, burning eyes, and "reduced quality of life."²⁹ An early study in Iowa by Thu et al. finds increases in eye and upper-respiratory problems among those living within 2 miles of an AO.³⁰ A later Iowa study³¹ finds extensive literature documenting acute and chronic respiratory disease and dysfunction among CAFO workers from exposures to complex mixtures of particulates, gases, and vapors; it concludes that CAFO air emissions may constitute a public health hazard.

Ables-Allison and Connor were among the first to examine property value impacts resulting from

airborne contamination and odors.³² Examining 288 sales between 1986 and 1989, they find that for every thousand animals added within a 5-mile area, there is an average sale price drop of \$430 per property, with the most significant losses within 1.6 miles. Notably, they find that during the first half of 1989 an AO with greater than 500 animals was 50 times more likely to have an odor complaint lodged with the state than one with fewer than 500 animals.³³

Taff, Tiffany, and Weisberg perform a hedonic price analysis on 292 rural residences in Minnesota and find a statistically significant pricing impact related both to the existence of an AO as well as the distance to the AO.³⁴ A 1996 study by Padgett and Johnson finds that homes within 0.5 mile of a CAFO decrease in value by 40%, and homes within 1.0 mile decrease in value by 30%, within 1.5 miles by 20%, and within 2.0 miles by 10%.³⁵ Palmquist, Roka, and Vukina quantitatively determine that AOs depress nearby home values. They develop a model to measure the spatial impacts of AOs and, like Padgett and Johnson, find differential value impacts at 0.5, 1.0, and 2.0 miles.³⁶

Hamed, Johnson, and Miller, quantify both the average value impact of an AO as well as the impact by distance with a study of 99 rural, non-family real estate transactions of more than one acre near an AO. Thirty-nine of the properties in the study included a residence. An average residential parcel within 3 miles of an AO experienced a loss of about 6.6%. However, if that parcel was located within 0.10 mile of the AO (the minimum unit of measure in the study), then the loss in value was estimated at about 88.3%.³⁷

26. Kilpatrick, "Concentrated Animal Feeding Operations."

27. Presentation at ABA Special Committee on Agricultural Management Roundtable II.

28. Susan S. Schiffman, Elizabeth A. Miller, Mark S. Suggs, and Breck G. Graham, "The Effect of Environmental Odors Emanating from Commercial Swine Operations on the Mood of Nearby Residents," *Brain Research Bulletin* 37, no. 4 (1995): 369-375.

29. S. Wing and S. Wolf, "Intensive Livestock Operations, Health, and Quality of Life Among North Carolina Residents," *Environmental Health Perspectives* 108, no. 3 (March 2000): 233-238.

30. K. Thu, K. Donham, R. Ziegenhorn, S. Reynolds, P. Thorne, P. Subramanian, P. Whitten, and J. Stookesberry, "A Control Study of the Physical and Mental Health of Residents Living Near a Large-Scale Swine Operation," *Journal of Agricultural Safety and Health* 3, no. 1 (1997): 13-26.

31. *Iowa Concentrated Animal Feeding Operations Air Quality Study—Final Report*[End Ital], Iowa State University and the University of Iowa Study Group (February 2002), http://www.public-health.uiowa.edu/ehsrc/CAFOstudy/CAFO_final2-14.pdf.

32. Abeles-Allison and Connor, *Analysis of Local Benefits and Costs of Michigan Hog Operations*.

33. As previously discussed, this study also reports that AOs affect the economics of local communities.

34. Steven J. Taff, Douglas G. Tiffany, and Sanford Weisberg, "Measured Effects of Feedlots on Residential Property Values in Minnesota: A Report to the Legislature" (U. Minnesota Staff Paper Series, July 1996), <http://ageconsearch.umn.edu/bitstream/14121/1/p96-12.pdf>.

35. Reported in William J. Weida, "The CAFO: Implications for Rural Economies in the US" (Colorado College working paper, February 24, 2004), <http://www.columbus.in.gov/planning/staff-reports/gelfius-materials-part-1/>.

36. R. Palmquist, F. Roka, and T. Vukina, "Hog Operations, Environmental Impacts, and Residential Property Values," *Land Economics* 73, no. 1 (1997): 114-124.

37. Mubarek Hamed, Thomas Johnson, and Kathleen Miller, "The Impacts of Animal Feeding Operations on Rural Land Values," University of Missouri-Columbia, Community Policy Analysis Center Report R-99-02 (May 1999).

Additional empirical studies have supplemented these findings. Kim and Goldsmith analyze property values of 2,155 homes located within 3 miles of an AO in North Carolina. The principle focus of their study is spatial hedonics, and within a 3-mile area they find the average impact to be negative 18%. At 1 mile, they find the impact is negative 23.5%.³⁸

Weida studies the economic and financial impact of CAFOs. While this study principally focuses on the diminished economic growth rates in communities surrounding CAFOs, it also notes the substantial decreases in property values in those areas, as evidenced by property tax reductions.³⁹

Kuethe and Keeney find that the negative impacts of AOs are comparable to those generated by industrial waste, solid waste, and septic waste facilities.⁴⁰ They focus on airborne-related problems and note that odor is a particular source of nuisance, and higher-valued residences are more severely impacted.

The odor and airborne particulate issues also have been explored in a more recent study by Isakson and Ecker. They examine the impact of swine CAFOs on sale prices of 5,822 houses in Iowa. The study shows large adverse impacts for houses located within 3 miles and directly downwind from a CAFO—a loss of value of as much as 44.1%. Value loss diminished to 16.6% for houses not directly downwind, and loss in value decreased to 9.9% for houses directly downwind but 3 miles away. Isakson and Ecker also find a correlation between CAFO size and value loss; a 10% increase in CAFO size resulted in a 0.67 % decrease in house price as far as 7 miles from the nearest CAFO.⁴¹

Studies Using GIS

Increasingly, AO studies have relied on geographic information systems (GIS) technology and other spatial methods to investigate property value impacts.

Worley Rupert, and Risse use GIS to examine the efficacy of buffers to mitigate AO impacts.⁴² They find that adding buffers to animal operations reduces the amount of land available within an area for such operations.

Cajka, Deerhake, and Yao present a study technique using GIS and modeling software to investigate the dispersion of air pollution emanating from CAFOs. The advantage of this approach is it looks at cumulative emissions from multiple sources.⁴³

Milla, Thomas, and Ansine, study homes in Craven County, North Carolina, use a GIS-based hedonic pricing model to evaluate the impacts of CAFOs, particularly hog operations, on residential property values. Their results indicate a negative and significant impact on property value from hog operations and a relationship between distance to hog farms and property sale prices. They determine that a farm with 5,000 animals has a statistically significant impact on values of homes 1 mile away, with an impact on the average home of 3.1%.⁴⁴

Based on the results of the case studies, it is quite apparent that significant externalities are associated with animal feeding operations, that the relationship between externalities, farm characteristics, and community attributes can be quite complex, and that negative impacts of animal facilities, as reflected in lowered property values, can extend beyond established setbacks. The GIS-based studies suggest the externalities associated with AOs are a function of distance and that the GIS-based hedonic price modeling is a promising method for assessing property value damages associated with animal operations, for evaluating potential impacts when siting new operations, and for developing setback guidelines.

38. Jungik Kim and Peter Goldsmith, "A Spatial Hedonic Approach to Assess the Impact of Swine Production on Residential Property Values," *Environmental and Resource Economics* 42, no. 4 (April 2009): 509–534.

39. William J. Weida, "Potential Regional Economic Effects of CAFOs" (Colorado College working paper, August 24, 2001), available at <http://sraproject.org/wp-content/uploads/2007/12/commentsonthepotentialregionaleconomiceffectsoffeedlots.pdf>.

40. Todd H. Kuethe and Roman Keeney, "Environmental Externalities and Residential Property Values: Externalized Costs Along the House Price Distribution," *Land Economics* 88, no. 2 (2002): 241–250, available at <http://naldc.nal.usda.gov/naldc/download.xhtml?id=54130&content=PDF>.

41. Hans R. Isakson and Mark D. Ecker, "An Analysis of the Impact of Swine CAFOs on the Value of Nearby Houses," *Agricultural Economics* 39, no. 3 (November 2008): 365–372.

42. J. W. Worley, C. Rupert, and L. M. Risse, "Use of GIS to Determine the Effect of Property Line and Water Buffers on Land Availability," *Applied Engineering in Agriculture* 17, no. 1 (September 2000): 49–54; available at <https://www.itos.uga.edu/library/buffers.pdf>.

43. Jamie Cajka, Marion Deerhake, and Chengwei Yao, "Modeling Ammonia Dispersion from Multiple CAFOs Using GIS," *Proceedings of the 24th ESRI Users Conference*, August 9–13, 2004, available at <http://proceedings.esri.com/library/userconf/proc04/docs/pap1381.pdf>.

44. Katherine Milla, Michael H. Thomas, and Winsbert Ansine, "Evaluating the Effect of Proximity to Hog Farms on Residential Property Values: A GIS-Based Hedonic Price Model Approach," *URISA Journal* 17, no. 1 (2005): 27–32.

Legal and Regulatory Actions

Legal and regulatory actions also can reveal the impacts of AOs on nearby properties. For example, in 2000, Central Industries operated a large-scale poultry rendering plant near Central, Mississippi. As part of the process, large quantities of poultry processing byproducts were brought to this facility for further processing. The plant had been subject to a number of flooding events, spreading bacteria-laced poultry byproducts into nearby creeks and downstream rivers. Poultry byproducts were discovered up to 50 miles away from the rendering plant. For violations of the Clean Water Act, company officers were fined varying amounts up to \$300,000 each, and the company was fined \$14 million.⁴⁵ Researchers found property value diminution of up to 60% for farms closest to the plant, and transaction prices impacted as far as 11 miles away.

In numerous counties across the country tax assessors have granted property value reductions as a result of proximity to AOs. For example, Beasley reports that Clark County, Illinois, established a property tax abatement for fifty homes around a swine AO. Homes within 0.5 mile were determined to have values diminished by 30%, ranging down to a 10% reduction in value for homes at 1.5 miles.⁴⁶

Aiken reports that the Nebraska Court of Appeals ruled that county board of equalization erred in not considering a rural residence's proximity to a swine facility in determining the residence's valuation. The owner of the facility also built a house 0.75 mile away and obtained an easement to spray the hog manure on the cropland across the road from the house. The court ordered the county to ignore the fact that the swine were also the property of the owner. The court cited Nebraska livestock nuisance decisions that show that hog odors would influence the home's value. Upon the ruling, the county accepted a determination by a local, independent appraiser that the value was diminished 30%.⁴⁷

Spears reports that in the summer of 2003, health officials declared about 40 kilometers of beaches on

Table 1 Property Tax Reductions in Areas Around AOs

Area	Amount of Reduction	Property Type
Grundy Co, MO	30%	
Mecosta Co, MI initially:	35%	Dwellings only
later changed to:	20%	Land and structures
Midland Co, MI	20%	
DeWitt Co, IL	30%	
McLean Co, IL	35%	
DeKalb Co, AL	Base reassessment, variable rates	
Renville Co, MN	Base reassessment, variable rates	Dwellings only
Humbolt Co, IA	20%-40%	Dwellings only
Frederick Co, MD	10%	
Muhlenberg Co, KY	18%	Dwellings only

Lake Huron permanently unsafe because of *E. coli* bacteria emanating from nearby AOs. This became the first new pollution hot spot on Canada's side of the Great Lakes in almost twenty years. Lab tests demonstrated that the *E. coli* levels in the streams feeding Lake Huron, and draining off nearby AOs, exceeded water quality standards by as much as 41,000 percent.⁴⁸

Ready and Abdalla expand upon the hedonic analyses of others and reviewed the amenity and disamenity impacts of agriculture in Berks County, Pennsylvania, including different types of open space (publicly owned, eased, vacant, pasture/crops), landfills, airports, mushroom production, and AOs. The study determines that "only landfills have a worse effect on adjacent property values,"⁴⁹ and further states, "a sewage treatment plant has less depressing effects on nearby housing prices

45. US Department of Justice Press Release, November 2, 2000.

46. Lee Beasley, "Cumberland Hog Facility May Affect Clark County Homeowners Property Values," *Guardian Publishing* (2001).

47. J. David Aiken, "Property Valuation May Be Reduced by Proximity of Livestock Operation" *Cornhusker Economics*, Department of Agricultural Economics, University of Nebraska-Lincoln (May 2002).

48. Tom Spears, "Ontario's West Coast Permanently Polluted," *The Ottawa Citizen* (November 15, 2003); also R. E. Dines, Deborah Henderson, and Louise Rock, "The Case Against Intensive Hog Operations" (working paper, February 2004).

49. Richard C. Ready and Charles W. Abdalla, "The Amenity and Disamenity Impacts of Agriculture: Estimates from a Hedonic Pricing Model," *American Journal of Agricultural Economics* 87, no. 2 (May 2005): 314-326.

than a factory farm operation.” The study also finds that the clustering of AOs within a certain area is the controlling factor, not the location of the nearest operation when considering proximity. The study reports a value impact of -4.1% from AOs within 800 meters, and at least -6.4% from within 500 meters, both of which were half the impact of a landfill at comparable distances. The study did not find any statistically significant difference in the effects based on AO size or species.

Herriges, Secchi, and Babcock expand upon previous work on AO price effects by using variables to quantify the effects in a hedonic analysis of proximity, size, and direction of nearest facility. Direction from site was included to determine the effect of being downwind, and the odor and pest issues associated with AOs. Results from this study indicate that a moderate-size facility has a value impact up to -6% within 1.5 miles and -26% within a 0.25 mile.⁵⁰

Finally, Keske documents ten lawsuits over AO nuisance in which the plaintiff prevailed, with jury awards ranging up to \$50 million (Table 2). The size of these awards suggests that preventive measures, even if expensive, might be cost effective.⁵¹

Summary of AO Empirical Findings

The establishment of an AO results in value diminution to nearby properties, both through a negative

externality as well as through indirect economic impacts. The amount of the value loss is an inverse function of distance (closer properties diminish more), a function of property type (newer, nicer residences lose more), and a function of property use (farms will lose value due to diminished productivity and comparative marketability to farm lands further away; residential use will no longer be a highest-and-best use). The empirical studies and case studies results indicate diminished marketability, loss of use and enjoyment, and loss of exclusivity that can range up to nearly 90% of otherwise unimpaired value for homes that are adjacent to the facility. Negative impacts are noted at distances exceeding 3 miles, and in the case of a flood or other weather event, waste from the facility can be spread over far greater areas, extending the area of negative impact (Table 3).

Mitigation of Impacts

There is surprisingly little empirical evidence of attempts to mitigate either the physical impacts or the perception of negative externality of AOs given the fairly consistent evidence of negative impacts on surrounding property values. The most significant and transcendent impacts are to surrounding community values and economics and to air quality. However, neither of these is well suited to mitigation efforts. Generally, mitigation fall into three categories: waste management plans, tree windbreaks, and anaerobic

Table 2 Damage Awards Related to AOs

Year/State	Jury Award	Case/Remarks
1991/NE	\$375,600	<i>Kopecky v. National Farms</i> , swine operation
1996/KS	\$12,100	Swine settlement – parties undisclosed in news article
1998/KS	> \$15,000	<i>Twietmeyer v. Blocker</i> , beef operations
1999/MO	\$5,200,000	<i>Hanes v. Continental Grain</i> , swine operation
2001/OH	\$19,182,483	<i>Seelke v. Buckeye Egg Farm</i> , poultry
2002/IA	\$33,065,000	<i>Blass v. Iowa Select Farms</i> , swine operation
2004/OH	\$50,000,000	<i>Bear v. Buckeye Egg Farm</i> , poultry
2006/AL	\$100,000	<i>Sierra Club v. Whitaker</i> , swine
2006/MO	\$4,500,000	<i>Turner v. Premium Standard Farms</i> , swine
2007/IL	\$27,000	State of Illinois (respondent unreported), swine

Source: Catherine M. H. Keske, “Determining the Economic Feasibility of Anaerobic Digestion in Colorado: Guidelines for Animal Farm Producers,” CSU Extension Fact Sheet 1.229 (2012).

50. Herriges, Secchi, and Babcock, “Living with Hogs in Iowa.”

51. Catherine M. H. Keske, “Determining the Economic Feasibility of Anaerobic Digestion in Colorado: Guidelines for Animal Farm Producers,” CSU Extension Fact Sheet 1.229 (2012), <http://www.ext.colostate.edu/pubs/livestk/01229.pdf>.

Table 3 Summary of Studies of AO Value Impacts

Case Study	Value Loss	Remarks
Ables-Allison and Connor (1990)	\$430 within 5 miles	Greatest impact within 1.6 miles
Taff, Tiffany, and Weisberg (1996)	N/A	AO sited near older, less-expensive homes
Palmquist, Roka, and Vukina (1997)	9%	Average up to 2 miles
Hamed Johnson, and Miller (1999)	6.6%–88%	Largest loss if within 0.10 mile
ABA Presentation (1999)	N/A	Confirmed respiratory problems
Central Industries (2000)	60% for farms closest to plant	USDOJ cases, values by appraisal
Beasley (2001)	Up to 30%	Impacts 10% at 1.5 miles
Aiken (2002)	30% @ 0.75 mile	Confirmed by court and local appraiser
Spears (2003)	N/A	40 km of beaches closed due to AO emissions
Herriges, Secchi, and Babcock (2003)	26% at 0.25 mile	Moderate-size AO, 6% at 1.5 miles
Weida (2004)	40% at 0.50 mile	10% at 2 miles
Ready and Abdalla (2005)	Residence at 0.25 mile > 6.4% Residence at 0.50 mile 4.1%	Roughly half the impact of a landfill
Kim and Goldsmith (2008)	23.5% at 1 mile	18% average within 3-mile radius
Isakson and Ecker (2008)	44%	Directly downwind and within 2 miles

Source: Catherine M. H. Keske, "Determining the Economic Feasibility of Anaerobic Digestion in Colorado: Guidelines for Animal Farm Producers," CSU Extension Fact Sheet 1.229 (2012).

digestion. Nonetheless, such mitigation does not appear to have an economically material impact on nearby property values.

Waste Management Plan

Laws or regulations typically require wastewater runoff treatment. However, some facilities go beyond that with actual waste management plans. There is some evidence that such plans will have marginal impact, as noted in the Ready and Abdalla study, which found a residential value differential of 4.2% versus 1.1%. Notably though, some of the most severe impacts have occurred near facilities with mandated waste management plans, particularly when and after those plans failed. For example, in one four-month period, the Central Industries facility studied by Ready and Abdalla committed approximately 1,114 permit violations, exceeding the pollutant limitations set forth in the company's permit by hundreds of percentage points and exceeding its permitted flow rate by millions of gallons. Hence, the efficacy of a waste management plan must be taken in the light of potential impacts of violations.⁵²

Planting Trees

The University of Delaware, College of Agriculture and Natural Resources, studied the planting of windbreaks around poultry houses to reduce odor, dust, feathers, and noises, and suggests that this approach can also ameliorate nitrogen in the groundwater.⁵³ However, several aspects regarding this mitigation study should be noted:

1. The study focus is on protecting the poultry houses themselves, not adjacent or nearby neighbors.
2. Establishment of an effective windbreak takes quite a few years and quite a few trees.
3. A windbreak may partially ameliorate view problems but does not seem to address the major issues of odor and other airborne contaminations (particles, insects, etc.).

Anaerobic Digestion Facility

The purpose of Keske's study was to provide guidance on the financial feasibility of a biogas-fueled cogeneration facility.⁵⁴ The study recognizes the significant production of flammable biogas by AOs and notes the feasibility of biogas-fueled cogeneration

52. Ready and Abdalla, "The Amenity and Disamenity Impacts of Agriculture."

53. George W. Malone, "Environmental and Production Benefits of Trees for Poultry Farms," U. Delaware Cooperative Extension Service (2001).

54. Keske, "Determining the Economic Feasibility of Anaerobic Digestion."

is limited by a number of factors. First, the up-front costs can be prohibitive—typically \$1.2 million, and up to \$5 million depending on the technology used. Also, annual operating costs are significant, and while these technologies are sold with the promise of offsetting electric bills, Keske notes that in the study area (Colorado) electricity rates are already lower than other parts of the United States. Hence, AO operators should be “particularly wary of relying on anaerobic digestion to generate revenues by selling electricity to the utility.” Finally, Keske notes that for a biogeneration facility to be feasible, at least two of the following criteria must be met:

1. The AO meets the definition of a confined AFO.
2. The waste stream can be combined with the waste stream of another operation or business (e.g., food manufacturing, municipal waste).
3. The AFO already receives frequent odor complaints.
4. The AFO produces swine or chickens (the two most egregious sources of biogas).
5. The AFO incurs more than \$5,000/month in average electricity or heating charges.

Keske notes that given the high threshold of cost of this mitigation approach, the approach is feasible only if it outweighs costs associated with not implementing a mitigation plan. As previously mentioned, to support this Keske documents ten lawsuits in which claimants were awarded as much as \$50 million for agricultural nuisance (Table 2). Notably, the two largest awards cited (\$50 million and \$19 million) were for poultry operations.⁵⁵

Summary and Conclusions

Since *The Appraisal Journal's* previous review of AO effects on proximate property values,⁵⁶ new study approaches have been identified. First, there has been an increased use of GIS by local governments, which has given researchers the ability to

conduct more thorough investigations. GIS provides researchers with more data—in abundance and in detail—and allows researchers to better locate which factors, and to what degree, have an effect on value.

Second, in conjunction with more data and use of GIS, there are substantial improvements in the hedonic analyses performed. Keske noted that early studies (such as the Taff, Tiffany and Weisberg study and the Palmquist, Roka, and Vukina study) were conducted on fewer than 300 sales transactions each, while the later study by Ready and Abdalla reviewed 8,090 sales, and the Herriges, Secchi, and Babcock study examined 1,145 sales transactions.

Third, because of the increased use of GIS and the results from the hedonic analysis in newer case studies, it has been shown that an AO's basic impact is related to proximity and size, but there are also other factors, such as the operations' waste management practices, that can reduce or exacerbate that impact. Overall, the new studies confirm the valuation impacts reported in earlier studies, as they range from 3.1% to 26% loss depending on multiple factors, and that properties immediately abutting an AO can be diminished as much as 88%. More importantly, however, is the discussion of the impact of other site-specific factors that were considered as part the hedonic analyses.

With respect to mitigation efforts, the Ready and Abdalla study of Berks County (Pennsylvania) shows that at 800 meters an operation with a waste management plan diminishes a house's value 1.1%, while an operation without such a plan would diminish the value 4.2%. Also related to this is the effect of operation size on property values. Both the Ready and Abdalla study and the Herriges, Secchi, and Babcock study show that a larger facility in close proximity would not necessarily decrease the value of a nearby property more than a smaller facility. Both of the studies concluded that this effect could be attributed to unmodeled characteristics such as waste management practices and other site-specific attributes.

55. Ibid.

56. Kilpatrick, “Concentrated Animal Feeding Operations.”

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Web Connections

Internet resources suggested by the Y. T. and Louise Lee Lum Library

eXtension Land-Grant University Cooperative Research Information

—Geospatial Technology

http://www.extension.org/geospatial_technology

—Animal Manure Management

http://www.extension.org/animal_manure_management

Food & Water Watch—Factory Farms

<http://www.foodandwaterwatch.org/food/factoryfarms/>

Texas A&M University, Texas Animal Management Issues Clearinghouse

<http://tammi.tamu.edu/index.html>

US Department of Agriculture, National Agricultural Library

<http://www.nal.usda.gov/topics>

US Environmental Protection Agency

—Agriculture Center

<http://www.epa.gov/agriculture>

—Drinking Water Regulations

<http://water.epa.gov/lawsregs/rulesregs/sdwa/currentregulations.cfm>

—Animal Feeding Operations Overview

<http://water.epa.gov/polwaste/npdes/afo/index.cfm>

Lancaster homes in 1-mile

PLANNING - SP18025 - ATTACHMENT #7B

PARCEL ID	ASSESSED VALUE-2018	TOTAL TAX AMOUNT-2017	SITE ADDRESS	LEGAL DESCRIPTION	OWNER	PSTL ADDRESS	PSTL CITY	PSTL STATE	PSTL ZIP	Loss To Taxes	Loss To Crete Schools	Loss To School Bond	Loss To Home Value
0205300001000	\$ 437,600	\$ 7,176.48	12700 SW 128TH ST, DENTON, NE 68333	55, T8, R5, 6th Principal Meridian, LOT 12 SW & LOT 7 SE	JURICEK, JOHN V & MARY ANNE	12700 SW 128 ST	DENTON	NE	68339	-\$2,152.94	-\$1,291.77	-\$236.82	-\$131,280.00
0206100005000	\$ 1,207,600	\$ 19,889.34	12120 SW 142ND ST, CRETE, NE 68333	56, T8, R5, 6th Principal Meridian, LOT 7 NW & LOT 6 SW	GERTSCH FAMILY TRUST	12120 SW 142 ST	DENTON	NE	68339	-\$5,966.80	-\$3,580.08	-\$656.35	-\$362,280.00
0206300001000	\$ 622,500	\$ 10,320.06	12897 W SALTILLO RD, DENTON, NE 68333	56, T8, R5, 6th Principal Meridian, LOT 1 NE	KRAUS, STEVEN A & DIANE L	12897 W SALTILLO RD	DENTON	NE	68339	-\$3,066.02	-\$1,839.61	-\$337.26	-\$186,750.00
0207200004000	\$ 260,200	\$ 4,278.68	13483 W BENNET RD, DENTON, NE 68333	57, T8, R5, 6th Principal Meridian, LOT 5 NE	JAMISON, JOHN PAUL & NELLE	2610 S 24 ST	LINCOLN	NE	68502	-\$1,283.60	-\$770.16	-\$141.20	-\$78,060.00
0207200005000	\$ 182,700	\$ 3,017.46	13351 W BENNET RD, DENTON, NE 68333	57, T8, R5, 6th Principal Meridian, LOT 4 NE	SCHWARZ, JAMES L	13351 W BENNET RD	DENTON	NE	68339	-\$905.24	-\$543.14	-\$99.58	-\$54,810.00
0207200006000	\$ 582,700	\$ 9,602.34	13031 W BENNET RD, DENTON, NE 68333	57, T8, R5, 6th Principal Meridian, LOT 3 NE	MCCONNELL, CURTIS H	13031 W BENNET RD	DENTON	NE	68339	-\$2,880.70	-\$1,728.42	-\$316.88	-\$174,810.00
0207300007000	\$ 301,300	\$ 4,963.72	14200 SW 142ND ST, CRETE, NE 68333	57, T8, R5, Acres 6th Principal Meridian, LOT 7 SW	JUNE, RUTH E	14200 SW 142 ST	CRETE	NE	68333	-\$1,489.12	-\$893.47	-\$163.80	-\$90,390.00
0207300008000	\$ 394,000	\$ 6,500.30	14370 SW 142ND ST, CRETE, NE 68333	57, T8, R5, Acres 6th Principal Meridian, LOT 6 SW	JUNE, DOUGLAS E & BULLING-JUNE, APRIL L	14370 SW 142 ST	CRETE	NE	68333	-\$1,950.09	-\$1,170.05	-\$214.51	-\$118,200.00
0207400001000	\$ 371,400	\$ 6,098.02	13350 W WITTSTRUCK RD, DENTON, NE 68333	57, T8, R5, 6th Principal Meridian, W1/2 SE EX RR ROW	DENTON STORAGE LLC	2825 PORTER RIDGE RD	LINCOLN	NE	68516	-\$1,829.41	-\$1,097.64	-\$201.23	-\$111,420.00
0208200001000	\$ 557,100	\$ 5,972.12	13385 SW 114TH ST, OENTON, NE 68333	58, T8, R5, 6th Principal Meridian, N 1/2 NE	JURICEK, JOHN V & MARYANNE	12700 SW 128 ST	DENTON	NE	68339	-\$1,791.64	-\$1,074.98	-\$197.08	-\$167,130.00
0217100003000	\$ 311,200	\$ 5,139.74	11801 W WITTSTRUCK RD, DENTON, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 9 NE	CAUOILL, BRIAN J & CONNIE J	11801 W WITTSTRUCK RD	CRETE	NE	68333	-\$1,541.92	-\$925.15	-\$169.61	-\$93,360.00
0217100004000	\$ 460,000	\$ 7,597.28	12201 W WITTSTRUCK RD, DENTON, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 7 N	DANEKAS, DARIN L & ANN ELIZABETH	12201 W WITTSTRUCK RD	CRETE	NE	68333	-\$2,279.18	-\$1,367.51	-\$250.71	-\$138,000.00
0217100012000	\$ 214,900	\$ 3,540.18	15080 SW 128TH ST, CRETE, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 23 NW	COE, SHELLEY R	15080 SW 128 ST	CRETE	NE	68333	-\$1,062.05	-\$637.23	-\$116.83	-\$64,470.00
0217100013000	\$ 328,400	\$ 5,415.64	12601 W WITTSTRUCK RD, DENTON, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 19 NW	LOMAX, MICHAEL W & HEATHER L	12601 W WITTSTRUCK RD	CRETE	NE	68333-3419	-\$1,624.69	-\$974.82	-\$178.72	-\$98,520.00
0217100015000	\$ 147,400	\$ 2,430.32	15064 SW 128TH ST, CRETE, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 47 NW	HOLLMAN, GREGORY DEAN	15064 SW 128 ST	CRETE	NE	68333	-\$729.10	-\$437.46	-\$80.20	-\$44,220.00
0217100016000	\$ 433,400	\$ 1,192.82	12501 W WITTSTRUCK RD, DENTON, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 21 & REMAINING PORTION OF LOT 20 NW	BARRETT, BRUCE L & MARINA C	12501 W WITTSTRUCK RD	CRETE	NE	68333	-\$357.85	-\$214.71	-\$39.36	-\$130,020.00
0217200005000	\$ 50,700	\$ 831.88	11501 W WITTSTRUCK RD, DENTON, NE 68333	517, T8, R5, 6th Principal Meridian, N1/2 NE NE	KURTZKE, JEREMY & KASSANDRA	11501 W WITTSTRUCK RD	CRETE	NE	68333	-\$249.56	-\$149.74	-\$27.45	-\$15,210.00
0217200006000	\$ 347,700	\$ 5,737.86	12001 W WITTSTRUCK RD, DENTON, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 18 NE	BOYER, GARY D & MARY A	12001 W WITTSTRUCK RD	CRETE	NE	68333-3302	-\$1,721.36	-\$1,032.81	-\$189.35	-\$104,310.00
0217300002000	\$ 553,300	\$ 9,138.22	12801 W PARKER RD, CRETE, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 26 SW	BARCLAY, WILLIAM K & NANCY L	12800 W PARKER RD	CRETE	NE	68333	-\$2,741.47	-\$1,644.88	-\$301.56	-\$165,990.00
0217300003000	\$ 879,700	\$ 14,529.00	12788 W ROCA RD, CRETE, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 27 SW	MARTIN ESTATES LLC	2315 WINDING RIDGE RD	LINCOLN	NE	68512	-\$4,358.70	-\$2,615.22	-\$479.46	-\$263,910.00
0217301007000	\$ 203,000	\$ 3,352.72	15701 LAKESIDE ESTATES DR, CRETE, NE 68333	ELSNER LAKESIDE ESTATES, BLOCK 3, Lot 4	FULTON, WM R & JANA	15701 LAKESIDE ESTATES DR	CRETE	NE	68333	-\$1,005.82	-\$603.49	-\$110.64	-\$60,900.00
0217301009000	\$ 319,800	\$ 5,281.78	15500 REDWING DR, CRETE, NE 68333	ELSNER LAKESIDE ESTATES, BLOCK 4, Lot 1	DOTY, HOWARD L & BETTY L	15500 REDWING DR	CRETE	NE	68333	-\$1,584.53	-\$950.72	-\$174.30	-\$95,940.00
0217301011000	\$ 231,000	\$ 3,815.18	15601 LAKESIDE ESTATES DR, CRETE, NE 68333	ELSNER LAKESIDE ESTATES, BLOCK 3, Lot 5, & ELSNER LAKESIDE ESTATES 1ST ADD BLOCK 2 S PT LOT 6	(BROOKS, JOSEPH & KATHRYN SCHOLZ, MICHAEL E & PAMELA K	15601 LAKESIDE ESTATES DR	CRETE	NE	68333	-\$1,144.55	-\$686.73	-\$125.90	-\$69,300.00
0217302001000	\$ 330,800	\$ 5,463.44	15855 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 1, Lot 1	VLASEK, CLARENCE F & PAMELA S	15855 BOBWWHITE TRL	CRETE	NE	68333	-\$1,639.03	-\$983.42	-\$180.29	-\$99,240.00
0217302002000	\$ 303,500	\$ 5,012.56	15751 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 1, Lot 2	SIEDHOFF, ROBERT A & JUDITH	15751 BOBWWHITE TRL	CRETE	NE	68333	-\$1,503.77	-\$902.26	-\$165.41	-\$91,050.00
0217302003000	\$ 337,700	\$ 5,577.40	15651 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 1, Lot 3	FEENEN, OOUGLAS & KELLY	15651 BOBWWHITE TRL	CRETE	NE	68333	-\$1,673.22	-\$1,003.93	-\$184.05	-\$101,310.00
0217302004000	\$ 289,100	\$ 4,774.74	15551 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 1, Lot 4	PAULSEN, DYLAN	15551 BOBWWHITE TRL	CRETE	NE	68333	-\$1,432.42	-\$859.45	-\$157.57	-\$86,730.00
0217302005000	\$ 266,000	\$ 4,393.20	15455 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 1, Lot 5	BRADLEY, KOLIN K & MERRI KAYE	15455 BOBTAIL TRL	CRETE	NE	68333	-\$1,317.96	-\$790.78	-\$144.98	-\$79,800.00
0217302006000	\$ 209,300	\$ 3,456.78	15401 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 1, Lot 6	DOREMUS, PAUL G & SHERI L	15401 BOBWWHITE ST	CRETE	NE	68333	-\$1,037.03	-\$622.22	-\$114.07	-\$62,790.00
0217302008000	\$ 745,200	\$ 12,307.62	15355 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 1, Lot 8	MALOUSEK, JOSEPH & AIMEE	15355 BOBWWHITE TRL	CRETE	NE	68333-3420	-\$3,692.29	-\$2,215.37	-\$406.15	-\$223,560.00
0217303001000	\$ 297,700	\$ 4,916.76	15660 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 2, Lot 1	WRIGHT, EDWARD ANDRUS	15660 BOBWWHITE TRL	CRETE	NE	68333	-\$1,475.03	-\$885.02	-\$162.25	-\$89,310.00
0217303002000	\$ 387,400	\$ 6,398.24	15600 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 2, Lot 2	MALY, R JASON & KARI L	15600 BOBWWHITE TRL	CRETE	NE	68333	-\$1,919.47	-\$1,151.68	-\$211.14	-\$116,220.00
0217303003000	\$ 299,400	\$ 4,944.86	15500 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 2, Lot 3	INGRAM, JOHN & CATHERINE	15500 BOBWWHITE TRL	CRETE	NE	68333	-\$1,483.46	-\$890.07	-\$163.18	-\$89,820.00
0217303004000	\$ 385,600	\$ 6,368.52	15380 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 2, Lot 4	INGRAM, JOHN & CATHERINE	15380 BOBWWHITE TRL	CRETE	NE	68333	-\$1,910.56	-\$1,146.33	-\$210.16	-\$115,680.00
0217303007000	\$ 277,200	\$ 4,578.20	12251 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 2, Lot 5 - 6, EX S PT (EX DESCR IN INST #1995-3885) A	AIDOWBEN, PETER & ANNA SILLIMAN	12251 BOBWWHITE TRL	CRETE	NE	68333	-\$1,373.46	-\$824.08	-\$151.08	-\$83,160.00
0217304001000	\$ 371,200	\$ 6,130.68	12250 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 3, Lot 1	FOWLER, DENNIS E & MONICA	12250 BOBWWHITE TRL	CRETE	NE	68333	-\$1,839.20	-\$1,103.52	-\$202.31	-\$111,360.00
0217304005000	\$ 366,800	\$ 6,058.02	12300 BOBWWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES 1ST ADDITION, BLOCK 3, Lot 2	SUEPER, JAMES R & KATHLEEN J TRUST	420 S BOSWELL AVE	CRETE	NE	68333	-\$1,817.41	-\$1,090.44	-\$199.91	-\$110,040.00
0217400005000	\$ 432,700	\$ 7,146.42	12100 W ROCA RD, CRETE, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 14 SE	CI FAMILY REVOCABLE TRUST	12100 W ROCA RD	CRETE	NE	68333	-\$2,143.93	-\$1,286.36	-\$235.83	-\$129,810.00
0217400013000	\$ 444,300	\$ 7,338.00	11900 W ROCA RD, CRETE, NE 68333	517, T8, R5, 6th Principal Meridian, LOT 32 SE	SEACREST, RHONDA	6901 KINGS CT	LINCOLN	NE	68516-2456	-\$2,201.40	-\$1,320.84	-\$242.15	-\$133,290.00
0217400014000	\$ 50,500	\$ 828.28		517, T8, R5, 6th Principal Meridian, LOT 34 SE	CI FAMILY REVOCABLE TRUST	12100 W ROCA RD	CRETE	NE	68333	-\$248.48	-\$149.09	-\$27.33	-\$15,150.00
0218200002000	\$ 314,500	\$ 5,167.78	15025 SW 128TH ST, CRETE, NE 68333	518, T8, R5, 6th Principal Meridian, LOTS 31 & 32 NE	POWELL, SHAWN R	15025 SW 128 ST	CRETE	NE	68333	-\$1,550.33	-\$930.20	-\$170.54	-\$94,350.00
0218200004000	\$ 213,300	\$ 3,522.84	13200 W PARKER RD, CRETE, NE 68333	518, T8, R5, 6th Principal Meridian, LOT 29 NE	HOWLETT, JANIS	13200 W PARKER RD	CRETE	NE	68333	-\$1,056.85	-\$634.11	-\$116.25	-\$63,990.00
0218300005000	\$ 376,700	\$ 6,189.32	15858 SW 142ND ST, CRETE, NE 68333	518, T8, R5, 6th Principal Meridian, LOT 35 SW	HAJEK, CHRISTOPHER J	Attn: ALBERT J HAJEK JR 810 E 2 ST	CRETE	NE	68333	-\$1,856.80	-\$1,114.08	-\$204.25	-\$113,010.00
0218400002000	\$ 416,300	\$ 6,831.06	13000 W ROCA RD, CRETE, NE 68333	518, T8, R5, 6th Principal Meridian, LOT 24 SE	DREVO, TODD E & CAVA, MELANIE R	779 AYALA LN	MONTECITO	CA	93108	-\$2,049.32	-\$1,229.59	-\$225.42	-\$124,890.00
Totals	\$ 16,512,600	\$ 283,125.86								-\$78,937.76	-\$47,362.65	-\$8,683.15	-\$4,953,840.00

44
total
parcels

Lancaster homes in 2-miles

PARCEL ID	ASSESSED VALUE-2018	TOTAL TAX AMOUNT-2017	SITE ADDRESS	LEGAL DESCRIPTION	OWNER	PSTL ADDRESS	PSTL CITY	PSTL STATE	PSTL ZIP	Loss To Taxes	Loss To Crete Schools	Loss To School Bond	Loss To Home Value
0205100001000	\$ 124,800	\$ 2,061.18	12000 SW 128TH ST, DENTON, NE 68333	S5, T8, R5, 6th Principal Meridian, LOT 9 NW	BOYD, BRADLEY M & BRITTANY C	12000 SW 128 ST	DENTON	NE	68333	-\$412.24	-\$247.34	-\$45.35	-\$24,960.00
0205200001000	\$ 1,009,200	\$ 16,540.28	12005 W SALTILLO RD, DENTON, NE 68333	S5, T8, R5, 6th Principal Meridian, LOTS 2 & 10 NE & W1/2 NE & LOT 13 SE & LOT 11 NW	AKSAMIT, AUSTIN L & KELLIE L	12005 W SALTILLO RD	DENTON	NE	68339	-\$3,308.06	-\$1,984.83	-\$363.89	-\$201,840.00
0209100003000	\$ 122,800	\$ 2,006.54		S9, T8, R5, Acres 6th Principal Meridian, LOT 22 NW	DAVIS BECKER LLC	6120 LOMA CIR	LINCOLN	NE	68516	-\$401.31	-\$240.78	-\$44.14	-\$24,560.00
0209400003000	\$ 453,100	\$ 7,483.34	13909 SW 100TH ST, DENTON, NE 68333	S9, T8, R5, 6th Principal Meridian, LOT 7 & REMAINING PORTION OF LOTS 5 & 12 SE	TALLEY, HERSCHEL B & BETTY P	13909 SW 100 ST	CRETE	NE	68333	-\$1,496.67	-\$898.00	-\$164.63	-\$90,620.00
0209400004000	\$ 465,000	\$ 7,673.58	13833 SW 100TH ST, DENTON, NE 68333	S9, T8, R5, 6th Principal Meridian, LOT 13 SE	RONK, THOMAS G & MARLA A	13833 SW 100 ST	CRETE	NE	68333-2643	-\$1,534.72	-\$920.83	-\$168.82	-\$93,000.00
0209400005000	\$ 806,800	\$ 13,325.00	10544 W WITTSTRUCK RD, DENTON, NE 68333	S9, T8, R5, 6th Principal Meridian, LOT 10 SE	GERDES, MITCHELL J	10544 W WITTSTRUCK RD	CRETE	NE	68333	-\$2,665.00	-\$1,599.00	-\$293.15	-\$161,360.00
0209400009000	\$ 608,300	\$ 10,039.44	10560 W WITTSTRUCK RD, DENTON, NE 68333	S9, T8, R5, 6th Principal Meridian, LOT 17 SE	FRIESEN, ARDELL R & CAROL A	10560 W WITTSTRUCK RD	CRETE	NE	68333	-\$2,007.89	-\$1,204.73	-\$220.87	-\$121,660.00
0209400010000	\$ 429,300	\$ 7,084.56	10548 W WITTSTRUCK RD, DENTON, NE 68333	S9, T8, R5, 6th Principal Meridian, LOT 18 SE	ALLEN, CRAIG R & PATRICIA A	10548 W WITTSTRUCK RD	CRETE	NE	68333	-\$1,416.91	-\$850.15	-\$155.86	-\$85,860.00
0209400011000	\$ 424,100	\$ 6,997.90	10540 W WITTSTRUCK RD, DENTON, NE 68333	S9, T8, R5, 6th Principal Meridian, LOT 19 SE	ISOM, DAVID P	10540 W WITTSTRUCK RD	CRETE	NE	68333-2576	-\$1,399.58	-\$839.75	-\$153.95	-\$84,820.00
0216200002000	\$ 429,400	\$ 5,780.70	15107 SW 100TH ST, CRETE, NE 68333	S16, T8, R5, 6th Principal Meridian, LOT 13 NW	MEINKE, ARNOLD F & BARBARA	15107 SW 100 ST	CRETE	NE	68333	-\$1,156.14	-\$693.68	-\$127.18	-\$85,880.00
0216200003000	\$ 216,000	\$ 2,615.24	14933 SW 100TH ST, CRETE, NE 68333	S16, T8, R5, 6th Principal Meridian, LOT 12 NE	NOVAK, IVAN F & HELEN J	14933 SW 100 ST	CRETE	NE	68333	-\$523.05	-\$313.83	-\$57.54	-\$43,200.00
0216300002000	\$ 295,600	\$ 4,832.30	10702 W ROCA RD, CRETE, NE 68333	S16, T8, R5, 6th Principal Meridian, LOT 7 SW	SHELBY CATTLE & EQUIPMENT CO	PO BOX 185	CRETE	NE	68333	-\$966.46	-\$579.88	-\$106.31	-\$59,120.00
0216300006000	\$ 310,800	\$ 5,133.12	11200 W ROCA RD, CRETE, NE 68333	S16, T8, R5, 6th Principal Meridian, LOT 16 SW	WEBER, DARREN J & MIRIAM S	11300 W ROCA RD	CRETE	NE	68333	-\$1,026.62	-\$615.97	-\$112.93	-\$62,160.00
0216300007000	\$ 385,500	\$ 6,351.86	15320 SW 114TH ST, CRETE, NE 68333	S16, T8, R5, 6th Principal Meridian, LOT 19 SW	HUGHES, PHILLIP D & MINDIE M	15320 SW 114 ST	CRETE	NE	68333	-\$1,270.37	-\$762.22	-\$139.74	-\$77,100.00
0216400002000	\$ 95,900	\$ 1,566.98	10680 W ROCA RD, CRETE, NE 68333	S16, T8, R5, Acres 6th Principal Meridian, LOT 21 SE	LAVAGUHN PLACEK, JESSICA REVOCABLE TRUST	PO BOX 247	CRETE	NE	68333	-\$313.40	-\$188.04	-\$34.47	-\$19,180.00
0217200004000	\$ 380,000	\$ 6,276.02	14801 SW 114TH ST, DENTON, NE 68333	S17, T8, R5, 6th Principal Meridian, S1/2 NE NE	OSBORNE, JESSE	14801 SW 114 ST	CRETE	NE	68333	-\$1,255.20	-\$753.12	-\$138.07	-\$76,000.00
0217200010000	\$ 400,900	\$ 6,614.36	15001 SW 114TH ST, CRETE, NE 68333	S17, T8, R5, 6th Principal Meridian, LOT 45 NE	HENNESSEY, PHYLLIS L & FLAHERTY, TIMOTHY V	15001 SW 114 ST	CRETE	NE	68333	-\$1,322.87	-\$793.72	-\$145.52	-\$80,180.00
0217200011000	\$ 305,100	\$ 5,032.92	15255 SW 114TH ST, CRETE, NE 68333	S17, T8, R5, 6th Principal Meridian, LOT 43 NE	JONES, JUSTIN G	15255 SW 114 ST	CRETE	NE	68333	-\$1,006.58	-\$603.95	-\$110.72	-\$61,020.00
0217301001000	\$ 133,600	\$ 2,206.52	12355 BOBWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES, BLOCK 1, Lot 1	MOHR, DAVID P & LORILEA A	12355 BOBWHITE TRL	CRETE	NE	68333	-\$441.30	-\$264.78	-\$48.54	-\$26,720.00
0217301002000	\$ 236,000	\$ 3,897.74	12401 BOBWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES, BLOCK 1, Lot 2	FISCHER-WADE, JAN M	12401 BOBWHITE TRL	CRETE	NE	68333	-\$779.55	-\$467.73	-\$85.75	-\$47,200.00
0217301003000	\$ 402,000	\$ 6,639.38	15770 LAKESIDE ESTATES DR, CRETE, NE 68333	ELSNER LAKESIDE ESTATES, BLOCK 2, Lot 1	SCHMIDT, STEVEN J	15770 LAKESIDE ESTATES DR	CRETE	NE	68333	-\$1,327.88	-\$796.73	-\$146.07	-\$80,400.00
0217301004000	\$ 279,500	\$ 4,616.18	15890 BOBWHITE TRL, CRETE, NE 68333	ELSNER LAKESIDE ESTATES, BLOCK 3, Lot 1	RIHA, SCOTT A	15890 BOBWHITE TRL	CRETE	NE	68333	-\$923.24	-\$553.94	-\$101.56	-\$55,900.00
0217301012000	\$ 306,500	\$ 5,062.10	15801 LAKESIDE ESTATES DR, CRETE, NE 68333	ELSNER LAKESIDE ESTATES, BLOCK 3, Lot 2 - 3	SLAVEN, STEVEN W & ANNETTE E	15801 LAKESIDE ESTATES DR	CRETE	NE	68333	-\$1,012.42	-\$607.45	-\$111.37	-\$61,300.00
0217400017000	\$ 437,600	\$ 7,220.96	11840 W ROCA RD, CRETE, NE 68333	S17, T8, R5, 6th Principal Meridian, LOT 40 21.38+- AC IN WEST PART SE	LINN, DAVID L & REGINA W	11840 W ROCA RD	CRETE	NE	68333	-\$1,444.19	-\$866.52	-\$158.86	-\$87,520.00
0217400020000	\$ 414,600	\$ 6,837.34	15477 SW 114TH ST, CRETE, NE 68333	S17, T8, R5, 6th Principal Meridian, LOT 49 SE	BURCHAM, SCOTT A & ANN H	15477 SW 114 ST	CRETE	NE	68333	-\$1,367.47	-\$820.48	-\$150.42	-\$82,920.00
0217400021000	\$ 325,800	\$ 5,377.78	15725 SW 114TH ST, CRETE, NE 68333	S17, T8, R5, 6th Principal Meridian, LOT 50 SE	HIGGINS, TIMOTHY & JENNY	15725 SW 114 ST	CRETE	NE	68333	-\$1,075.56	-\$645.33	-\$118.31	-\$65,160.00
0219100002000	\$ 337,500	\$ 5,546.02	13751 W ROCA RD, CRETE, NE 68333	S19, T8, R5, 6th Principal Meridian, LOT 9 NW	HAEK, EUGENE J TRUST	13751 W ROCA RD	CRETE	NE	68333	-\$1,109.20	-\$665.52	-\$122.01	-\$67,500.00
0219100004000	\$ 319,900	\$ 5,230.58	16450 SW 142ND ST, CRETE, NE 68333	S19, T8, R5, 6th Principal Meridian, LOT 21 NW	BEHAVEN FARMS LLC	PO BOX 368	CRETE	NE	68333	-\$1,046.12	-\$627.67	-\$115.07	-\$63,980.00
0219200002000	\$ 364,400	\$ 5,417.12	16501 SW 128TH ST, CRETE, NE 68333	S19, T8, R5, 6th Principal Meridian, E1/2 S1/2 NE1/4 & E1/2 LOT 7 NE	MARISKA, BERNARD D & BARBARA E	16501 SW 128 ST	CRETE	NE	68333	-\$1,083.42	-\$650.05	-\$119.18	-\$72,880.00
0219300001000	\$ 135,700	\$ 2,218.86		S19, T8, R5, 6th Principal Meridian, LOT 19 SW	JULIAN, THOMAS G & EMMA LOUISE	13700 W MARTELL RD	CRETE	NE	68333	-\$443.77	-\$266.26	-\$48.81	-\$27,140.00
0219300003000	\$ 190,100	\$ -	13700 W MARTELL RD, CRETE, NE 68333	S19, T8, R5, 6th Principal Meridian, LOT 14 SW	JULIAN, THOMAS G & EMMA L	13700 W MARTELL RD	CRETE	NE	68333	\$0.00	\$0.00	\$0.00	-\$38,020.00
0219300006000	\$ 181,100	\$ 488.56	16744 SW 142ND ST, CRETE, NE 68333	S19, T8, R5, 6th Principal Meridian, LOT 20 W1/2	CIHAL, ALDEN L SR	16744 SW 142 ST	CRETE	NE	68333	-\$97.71	-\$58.63	-\$10.75	-\$36,220.00
0219400005000	\$ 209,000	\$ 3,451.82	13300 W MARTELL RD, CRETE, NE 68333	S19, T8, R5, 6th Principal Meridian, LOT 23 SE	MILLER, MARK A & TELLIHO, MONICA T	13300 W MARTELL RD	CRETE	NE	68333	-\$690.36	-\$414.22	-\$75.94	-\$41,800.00
0219400006000	\$ 595,800	\$ 9,736.70	17353 SW 128TH ST, CRETE, NE 68333	S19, T8, R5, 6th Principal Meridian, LOT 24 & E1/2 SE	JOHNSON, JAMES C & PAMELA S	1005 BRIARWOOD DR	LAKEWOOD	NY	14750	-\$1,947.34	-\$1,168.40	-\$214.21	-\$119,160.00
0220100006000	\$ 237,700	\$ 3,925.82	16676 SW 128TH ST, CRETE, NE 68333	S20, T8, R5, 6th Principal Meridian, LOT 18 NW	ROSBURG, MICHAEL JR & PATRICIA	16676 SW 128 ST	CRETE	NE	68333	-\$785.16	-\$471.10	-\$86.37	-\$47,540.00
0220200002000	\$ 655,900	\$ 10,740.06	16561 SW 114TH ST, CRETE, NE 68333	S20, T8, R5, 6th Principal Meridian, LOT 10 NE	KUNZ, NANCY L TRUST	7401 POSSUM CIR	UNCOLN	NE	68506	-\$2,148.01	-\$1,288.81	-\$236.28	-\$131,180.00
0220400006000	\$ 217,200	\$ 3,587.24	16887 SW 114TH ST, CRETE, NE 68333	S20, T8, R5, 6th Principal Meridian, LOT 15 SE	BARAK, DENNIS & CHRISTINE M	16887 W MARTELL RD	CRETE	NE	68333-3380	-\$717.45	-\$430.47	-\$78.92	-\$43,440.00
0221100005000	\$ 250,300	\$ 4,132.52	16200 SW 114TH ST, CRETE, NE 68333	S21, T8, R5, 6th Principal Meridian, LOT 15 NW	HOESCHE, JOSEPH C & CYNTHIA S	16200 SW 114 ST	CRETE	NE	68333	-\$826.50	-\$495.90	-\$90.92	-\$50,060.00
0331400005000	\$ 96,100	\$ 1,571.96	13030 W SALTILLO RD, DENTON, NE 68339	S31, T9, R5, 6th Principal Meridian, SW SE	KOK COFFEE LLC	6040 VILLAGE DR	LINCOLN	NE	68516	-\$314.39	-\$188.64	-\$34.58	-\$19,220.00
0332200004000	\$ 655,900	\$ 10,770.54	11080 SW 119TH ST, DENTON, NE 68339	S32, T9, R5, 6th Principal Meridian, LOT 6 NE & LOT 16 SE	MOHRHAUSER, NATHAN M & ALISA	11080 SW 119 ST	DENTON	NE	68339	-\$2,154.11	-\$1,292.46	-\$236.95	-\$131,180.00
0332400007000	\$ 233,700	\$ 3,859.76	11100 SW 119TH ST, DENTON, NE 68339	S32, T9, R5, 6th Principal Meridian, LOT 19 SE	LOVE, JENNIFER E	11100 SW 119 ST	DENTON	NE	68339	-\$771.95	-\$463.17	-\$84.91	-\$46,740.00
Totals	\$ 14,478,500	\$ 229,950.88								-\$45,990.18	-\$27,594.11	-\$5,058.92	-\$2,895,700.00

Lancaster homes in 3-miles

PARCELID	ASSESSED VALUE-2018	TOTAL TAX AMOUNT-2017	SITE ADDRESS	LEGAL DESCRIPTION	OWNER	PSLT ADDRESS	PSLT CITY	PSLT STATE	PSLT ZIP	Loss To Taxes	Loss To Crete Schools	Loss To School Bond	Loss To Home Value
0203100004000	\$ 641,400	\$	10,588.06 11700 SW 100TH ST, DENTON, NE 68333	S3, T8, R5, 6th Principal Meridian, LOT 15 NW	NATIONAL AUDUBON SOCIETY THE	225 VARICK ST FL 7	NEW YORK	NY	10014-4396	-\$1,058.81	-\$635.28	-\$116.47	-\$64,140.00
0203100006000	\$ 331,000	\$	5,466.74 11500 SW 100TH ST, DENTON, NE 68333	S3, T8, R5, 6th Principal Meridian, LOT 13 NW	SHEARER, LYLE A & ADATH A	11500 SW 98 ST	DENTON	NE	68339	-\$546.67	-\$328.00	-\$60.13	-\$33,100.00
0209200005000	\$ 154,200	\$	2,538.50 13505 SW 100TH ST, DENTON, NE 68333	S9, T8, R5, Acres 6th Principal Meridian, LOT 27 NE	TUXHORN, GARY L	4233 W BILLY CT	LINCOLN	NE	68524	-\$253.85	-\$152.31	-\$27.92	-\$15,420.00
0209400012000	\$ 659,800	\$	10,892.66 14133 SW 100TH ST, DENTON, NE 68333	S9, T8, R5, 6th Principal Meridian, LOT 20 SE	BURHAM, BARBARA J REVOCABLE TRUST	14133 SW 100 ST	CRETE	NE	68333	-\$1,089.27	-\$653.56	-\$119.82	-\$65,980.00
0210100001000	\$ 981,900	\$	16,045.64 14312 SW 100TH ST, DENTON, NE 68333	S10, T8, R5, 6th Principal Meridian, LOT 1 NW & E1/2 NW & LOT 2 SW & E1/2 SW	SMITH, LOWELL D & JOANN M	7135 SADDLE UP DR	COLORADO SPRINGS	CO	80922	-\$1,604.56	-\$962.74	-\$176.50	-\$98,190.00
0210400001000	\$ 579,400	\$	9,515.02 9020 W WITTS TRUCK RD, DENTON, NE 68333	S10, T8, R5, 6th Principal Meridian, W 1/2 SE	VOLLMAH, JANICE	9020 W WITTS TRUCK RD	CRETE	NE	68333	-\$951.50	-\$570.90	-\$104.67	-\$57,940.00
0215200014000	\$ 878,500	\$	14,399.70 8905 W WITTS TRUCK RD, DENTON, NE 68333	S15, T8, R5, 6th Principal Meridian, S1/2 NE & LOTS 15 - 26 NE	HOLLAM FARMES LLC	8905 WITTS TRUCK RD	CRETE	NE	68333	-\$1,439.97	-\$863.98	-\$154.40	-\$87,850.00
0215300001000	\$ 242,100	\$	1,132.06 9818 W ROCA RD, CRETE, NE 68333	S15, T8, R5, 6th Principal Meridian, LOT 14 SW	SIECK, FRANCES ANN LIFE ESTATE	9818 W ROCA RD	CRETE	NE	68333	-\$113.21	-\$67.92	-\$12.45	-\$24,210.00
0215300003000	\$ 101,700	\$	1,664.04 9818 W ROCA RD, RURAL, NE	S15, T8, R5, 6th Principal Meridian, LOT 13 SW	SIECK, FRANCES ANN LIFE ESTATE	9818 W ROCA RD	CRETE	NE	68333	-\$166.40	-\$99.84	-\$18.30	-\$10,170.00
0215400001000	\$ 1,018,900	\$	16,689.06 8966 W ROCA RD, CRETE, NE 68333	S15, T8, R5, 6th Principal Meridian, LOT 5 SE & N 1/2 SE	THEASMEYER, DUANE D & MARLES A	8966 W ROCA RD	CRETE	NE	68333-5026	-\$1,668.91	-\$1,001.34	-\$183.58	-\$101,890.00
0220400004000	\$ 202,400	\$	3,340.54 17401 SW 114TH ST, CRETE, NE 68333	S20, T8, R5, 6th Principal Meridian, LOT 1 SE	BLEICH, RAY & BONNIE M	17401 SW 114 ST	CRETE	NE	68333	-\$334.05	-\$200.43	-\$36.75	-\$20,240.00
0221300001000	\$ 379,900	\$	6,081.68 10900 W MARTELL RD, CRETE, NE 68333	S21, T8, R5, 6th Principal Meridian, LOT 12 SW	SAFRANEK, RONALD O & DIANE L	10900 W MARTELL RD	CRETE	NE	68333-9653	-\$408.17	-\$244.90	-\$44.90	-\$37,990.00
0222100004000	\$ 264,900	\$	4,362.16 16330 SW 100TH ST, CRETE, NE 68333	S22, T8, R5, 6th Principal Meridian, LOT 11 NW	REETZ, TIMOTHY A & CHRISTINE L	16330 SW 100 ST	CRETE	NE	68333	-\$436.22	-\$261.73	-\$47.98	-\$26,490.00
0222100006000	\$ 444,300	\$	4,433.84 16400 SW 100TH ST, CRETE, NE 68333	S22, T8, R5, Acres 6th Principal Meridian, LOT 14 NW	REETZ, ELMER & SHIRLEY LIFE ESTATE	16400 SW 100 ST	CRETE	NE	68333	-\$443.38	-\$266.03	-\$48.77	-\$44,430.00
0222100007000	\$ -	\$	13.08	S22, T8, R5, Acres 6th Principal Meridian, REM PT S1/2 NW	REETZ, TIMOTHY A & CHRISTINE L	16330 SW 100 ST	CRETE	NE	68333	-\$11.31	-\$0.78	-\$0.14	-\$0.00
0228100006000	\$ 357,100	\$	5,897.80 11011 W MARTELL RD, CRETE, NE 68333	S28, T8, R5, 6th Principal Meridian, LOT 20 NW	KERRY, DUSTIN & JOEY	11011 W MARTELL RD	CRETE	NE	68333	-\$589.78	-\$353.87	-\$64.88	-\$35,710.00
0228200004000	\$ 239,100	\$	3,935.02 10525 W MARTELL RD, CRETE, NE 68333	S28, T8, R5, Acres 6th Principal Meridian, LOT 25 NE	REITZ, TERRY & GENEAN	10525 W MARTELL RD	CRETE	NE	68333	-\$393.50	-\$236.10	-\$43.29	-\$23,910.00
0218200005000	\$ 70,600	\$	1,154.08 10655 W MARTELL RD, CRETE, NE 68333	S28, T8, R5, Acres 6th Principal Meridian, LOT 26 NE	GARVIN, LAUCE & ERIN	10655 W MARTELL RD	CRETE	NE	68333	-\$115.41	-\$69.24	-\$12.69	-\$7,060.00
0218300001000	\$ 277,000	\$	4,574.90 18200 SW 114TH ST, CRETE, NE 68333	S28, T8, R5, 6th Principal Meridian, LOT 4 SW	JENSBY, DAVID G & KYLA R	18200 SW 114 ST	CRETE	NE	68333	-\$457.49	-\$274.49	-\$50.32	-\$27,700.00
0218300003000	\$ 614,700	\$	6,932.16 10860 W SPRAGUE RD, CRETE, NE 68333	S28, T8, R5, 6th Principal Meridian, LOT 17 SW	NELSON, MARLYN	10860 W SPRAGUE RD	CRETE	NE	68333	-\$693.22	-\$415.93	-\$76.25	-\$61,470.00
0229100005000	\$ 201,500	\$	1,465.68 12165 W MARTELL RD, CRETE, NE 68333	S29, T8, R5, 6th Principal Meridian, LOT 10 NW	WILD, WALLACE L & NOREEN L LIFE ESTATES	12165 W MARTELL RD	CRETE	NE	68333	-\$146.57	-\$87.94	-\$16.12	-\$20,150.00
0229200004000	\$ 238,800	\$	3,935.22 11913 W MARTELL RD, CRETE, NE 68333	S29, T8, R5, 6th Principal Meridian, LOT 12 NE	HENNING, TROY W & CARI K	11913 W MARTELL RD	CRETE	NE	68333	-\$393.52	-\$236.11	-\$43.29	-\$23,880.00
0229200005000	\$ 329,900	\$	4,793.40 11487 W MARTELL RD, CRETE, NE 68333	S29, T8, R5, 6th Principal Meridian, LOT 13 NE PT IN NE NE	HENNING, DONNA JEAN LIFE ESTATE	11487 W MARTELL RD	CRETE	NE	68333	-\$479.34	-\$287.60	-\$52.73	-\$32,990.00
0229200006000	\$ 368,400	\$	6,077.06 17979 SW 114TH ST, CRETE, NE 68333	S29, T8, R5, 6th Principal Meridian, LOT 8 NE	PAULSEN, RAY & LAURIE	17979 SW 114 ST	CRETE	NE	68333-9620	-\$607.71	-\$364.62	-\$66.85	-\$36,840.00
0229300002000	\$ 608,500	\$	9,974.52 12720 W SPRAGUE RD, CRETE, NE 68333	S29, T8, R5, 6th Principal Meridian, LOT 5 SW	MEINKE, DARREN & DARCY	12720 W SPRAGUE RD	CRETE	NE	68333	-\$997.45	-\$598.47	-\$109.72	-\$60,850.00
0230300005000	\$ 208,300	\$	3,425.10 18844 SW 142ND ST, CRETE, NE 68333	S30, T8, R5, 6th Principal Meridian, LOT 15 SW	YOST, BRADLEY A	18844 SW 142 ST	CRETE	NE	68333-5041	-\$342.51	-\$205.51	-\$37.68	-\$20,830.00
0230400006000	\$ 248,800	\$	4,109.14 13000 W SPRAGUE RD, CRETE, NE 68333	S30, T8, R5, 6th Principal Meridian, LOT 12 SE	HIER, RODNEY A	13000 W SPRAGUE RD	CRETE	NE	68333	-\$410.91	-\$246.55	-\$45.20	-\$24,880.00
0230400009000	\$ 278,000	\$	4,591.42 18255 SW 128TH ST, CRETE, NE 68333	S30, T8, R5, 6th Principal Meridian, LOT 18 SE	MYERS, KIRK E & DEBORAH L	18255 SW 128 ST	CRETE	NE	68333	-\$459.14	-\$275.49	-\$50.51	-\$27,800.00
0230400010000	\$ 134,100	\$	2,214.78 18801 SW 128TH ST, CRETE, NE 68333	S30, T8, R5, 6th Principal Meridian, LOT 19 SE	MEINKE, DARREN & DARCY L	12720 W SPRAGUE RD	CRETE	NE	68333	-\$221.48	-\$132.89	-\$24.36	-\$13,410.00
0238300004000	\$ 613,500	\$	10,034.06 11215 W YANKEE HILL RD, DENTON, NE 68339	S28, T9, R5, 6th Principal Meridian, LOT 13 & LOT 33 & LOT 34 EC .89AC ON THE NORTH PREVIOUSLY KNOWN AS LOT 15 SW	SHOEMAKER, DON M & YVONNE TR	PO BOX 435	DENTON	NE	68339	-\$1,003.41	-\$602.04	-\$110.37	-\$61,350.00
0239300001000	\$ 239,500	\$	3,934.28 12001 W BEAM HILL RD, DENTON, NE 68339	S29, T9, R5, 6th Principal Meridian, LOT 14 SW	THAYER, ELAINE A	11501 W MIDWAY RD	DENTON	NE	68339	-\$393.43	-\$236.06	-\$43.28	-\$23,950.00
0239300003000	\$ 119,000	\$	1,957.74 9818 SW 126TH ST, DENTON, NE 68339	S29, T9, R5, 6th Principal Meridian, LOT 4 SW	SCHIEDLER, WILLIAM D	9700 SW 126 ST	DENTON	NE	68339	-\$472.68	-\$283.61	-\$52.00	-\$28,620.00
0239300005000	\$ 286,200	\$	4,726.84 9700 SW 126TH ST, DENTON, NE 68339	S29, T9, R5, 6th Principal Meridian, LOT 10 SW	POPE, CURTIS RAY & MICHELEVE	12301 W BEAM HILL RD	DENTON	NE	68339	-\$590.19	-\$354.12	-\$64.92	-\$35,780.00
0239300006000	\$ 357,800	\$	5,901.94 12301 W BEAM HILL RD, DENTON, NE 68339	S29, T9, R5, 6th Principal Meridian, LOT 9 SW	COLEMAN, GEOFFREY A & LYNN D	PO BOX 435	DENTON	NE	68339	-\$1,947.57	-\$1,168.54	-\$214.23	-\$118,470.00
0239400002000	\$ 1,184,700	\$	19,475.74 11215 W YANKEE HILL RD, DENTON, NE 68339	S29, T9, R5, 6th Principal Meridian, LOT 12 SE	SHOEMAKER, DON M & YVONNE TR	PO BOX 21792	LINCOLN	NE	68542	-\$380.56	-\$228.34	-\$41.86	-\$23,090.00
0330400003000	\$ 230,900	\$	3,805.60 13200 W ROKEBY RD, DENTON, NE 68339	S30, T9, R5, 6th Principal Meridian, LOT 3 SE	HOMETOWN HANDYMAH INC	9731 SW 126 ST	DENTON	NE	68339	-\$280.27	-\$168.16	-\$30.83	-\$16,970.00
0330400006000	\$ 169,700	\$	2,802.74 9731 SW 126TH ST, DENTON, NE 68339	S30, T9, R5, 6th Principal Meridian, LOT 4 SE	FRANCK, JERRY J & REBEKAH A	PO BOX 30533	LINCOLN	NE	68503	-\$577.89	-\$346.73	-\$63.57	-\$34,990.00
0330400008000	\$ 349,900	\$	5,778.90 9251 SW 126TH ST, DENTON, NE 68339	S30, T9, R5, 6th Principal Meridian, LOT 6 SE	MCVEIGH, KENNETH GLEN	9700 SW 126 ST	DENTON	NE	68339-3241	-\$542.78	-\$325.67	-\$59.71	-\$32,920.00
0330400010000	\$ 329,200	\$	5,427.78 9505 SW 126TH ST, DENTON, NE 68339	S30, T9, R5, 6th Principal Meridian, LOT 7 SE	REINHER, KRISTIN P	12710 W ROKEBY RD	DENTON	NE	68339	-\$394.46	-\$236.67	-\$43.39	-\$23,920.00
0330400011000	\$ 239,200	\$	3,944.58 12710 W ROKEBY RD, DENTON, NE 68339	S30, T9, R5, 6th Principal Meridian, LOT 9 SE	MURPHY, ANH M	9815 SW 126 ST	DENTON	NE	68339	-\$58.06	-\$34.83	-\$6.39	-\$26,590.00
0330400012000	\$ 265,900	\$	580.56 9815 SW 126TH ST, DENTON, NE 68339	S30, T9, R5, 6th Principal Meridian, LOT 10 SE	LAHM, CONNIE L	13401 W ROKEBY RD	DENTON	NE	68339	-\$306.70	-\$184.02	-\$33.74	-\$18,570.00
0331100003000	\$ 185,700	\$	3,067.00 13401 W ROKEBY RD, DENTON, NE 68339	S31, T9, R5, 6th Principal Meridian, LOT 1 IN N1/2	MINZEL, GARY & JUDITH	4636 TIPPERARY TRL	LINCOLN	NE	68512	-\$108.02	-\$64.81	-\$11.88	-\$6,600.00
0331100005000	\$ 66,000	\$	1,080.24 13455 W ROKEBY RD, DENTON, NE 68339	S31, T9, R5, 6th Principal Meridian, LOT 5 NW	WELDON, ROBERT ALLEN JR	10540 SW 140 ST	DENTON	NE	68339	-\$639.20	-\$383.52	-\$70.31	-\$38,730.00
0331100011000	\$ 387,300	\$	6,391.96 10540 SW 140TH ST, DENTON, NE 68339	S31, T9, R5, 6th Principal Meridian, LOT 11 NW	JACKSON, JUSTIN & PYFFE, KRISTIN E	3900 OLD CHENEY RD STE 201-222	LINCOLN	NE	68516	-\$111.11	-\$66.67	-\$12.22	-\$6,800.00
0331100013000	\$ 68,000	\$	1,111.10 10542 SW 140TH ST, DENTON, NE 68339	S31, T9, R5, 6th Principal Meridian, LOT 13 N1/2	CHENEY, BRADLEY WARREN & KORTH-CHENEY, SARAH MARGARET	2601 W CLAIRE AVE	DENTON	NE	68523	-\$546.90	-\$328.14	-\$60.16	-\$33,180.00
0331100014000	\$ 331,800	\$	5,469.00 13141 W ROKEBY RD, DENTON, NE 68339	S31, T9, R5, 6th Principal Meridian, LOT 14 N1/2	URBAN, DANIELLE & HAUSER, BLAKE	13131 W ROKEBY RD	DENTON	NE	68339	-\$799.07	-\$479.44	-\$87.90	-\$48,410.00
0331200004000	\$ 484,100	\$	7,990.72 13131 W ROKEBY RD, DENTON, NE 68339	S31, T9, R5, 6th Principal Meridian, LOT 3 NE	HAGEMAN, LAWRENCE & CHRISTINE	1600 SW 56 ST	LINCOLN	NE	68522	-\$186.71	-\$112.03	-\$20.54	-\$11,350.00
0331200006000	\$ 113,500	\$	1,867.12 13121 W ROKEBY RD, DENTON, NE 68339	S31, T9, R5, 6th Principal Meridian, LOT 15 NE	SHOTKOSKI, GARY J & KARYN R	10345 SW 119 ST	DENTON	NE	68339	-\$664.99	-\$399.00	-\$73.15	-\$40,300.00
0332100002000	\$ 403,000	\$	6,649.94 10345 SW 119TH ST, DENTON, NE 68339	S32, T9, R5, 6th Principal Meridian, LOT 20 NW	FOLEY, BRETT P & LINDY K	10101 SW 119 ST	DENTON	NE	68339-9760	-\$456.86	-\$274.12	-\$50.25	-\$55,480.00
0332100003000	\$ 554,800	\$	4,568.60 10101 SW 119TH ST, DENTON, NE 68339	S32, T9, R5, 6th Principal Meridian, LOT 21 NW	KRAUS, GERALD A & MARGIE J	10250 SW 119 ST	DENTON	NE	68339	-\$845.97	-\$507.58	-\$93.06	-\$51,260.00
0332200006000	\$ 512,600	\$	8,459.68 10250 SW 119TH ST, DENTON, NE 68339	S32, T9, R5, 6th Principal Meridian, LOT 12 NE	SAVAGE, ROBERT & DEBRA FAMILY TRUST, THE	10444 SW 119 ST	DENTON	NE	68339	-\$739.73	-\$443.84	-\$81.37	-\$44,820.00
0332200008000	\$ 448,200	\$	7,397.26 10444 SW 119TH ST, DENTON, NE 68339	S32, T9, R5, 6th Principal Meridian, LOT 13 NE	MAIHAH, CLIFTON & KAILA	10444 SW 119 ST	DENTON	NE	68339	-\$739.73	-\$443.84	-\$81.37	-\$44,820.00
0333100005000	\$ 1,637,400	\$	26,788.96 10860 W SALTILLO RD, DENTON, NE 68339	S33, T9, R5, 6th Principal Meridian, LOTS 1, 3, 4 & 5	ATKINS, CHERE LEE	10850 W SALTILLO RD	DENTON	NE	68339-3278	-\$2,678.70	-\$1,607.22	-\$294.66	-\$163,740.00
Totals	\$ 70,825,100	\$	1,177,431.40							-\$31,745.34	-\$19,087.20	-\$3,491.99	-\$2,083,310.00