State Office of Administrative Hearings

Kristofer S. Monson
Chief Administrative Law Judge

June 16, 2023

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RE: Docket Number 582-22-0844.TCEQ; Texas Commission on Environmental Quality No. 2021-1000-MSW; *In the Matter of the Application by Diamond Back Recycling and Sanitary Landfill, LP for MSW Permit No. 2404*

Dear Parties:

Please find attached a Proposal for Decision in this case. Exceptions and replies may be filed by any party in accordance with 30 Texas Administrative Code section 80.257.

CC: Service List

SOAH Docket No. 582-22-0844 **Suffix: TCEQ**

BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

APPLICATION BY DIAMOND BACK RECYCLING AND SANITARY LANDFILL, LP FOR MSW PERMIT NO. 2404

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BEFORE THE
STATE OFFICE OF ADMINISTRATIVE HEARINGS

APPLICATION BY DIAMOND BACK RECYCLING AND SANITARY LANDFILL, LP FOR MSW PERMIT NO. 2404

SUPPLEMENTAL PROPOSAL FOR DECISION ON REMAND

Diamond Back Recycling and Sanitary Landfill, LP (Applicant) filed an application (Application) with the Texas Commission on Environmental Quality (TCEQ or Commission) for a new Municipal Solid Waste (MSW) permit to authorize construction and operation of a Type I MSW landfill, with both Type I and Type IV disposal cells, in Ector County. TCEQ's Executive Director (ED) has recommended granting the Application and issuing a draft permit he proposed (Draft Permit). Knox Real Property Development, LLC (Knox), Jason Harrington

(Harrington) (collectively, Protestants), and Diversity Trucking[1] oppose the Application and Draft Permit. A hearing was held on the Application (Initial Hearing), and the Administrative Law Judge (ALJ) issued a Proposal for Decision (Initial PFD) recommending that it be denied. The Commission considered the Initial PFD and remanded this proceeding so that additional evidence could be taken.

On remand, Applicant was represented by attorneys Michael Woodward, Barton Hejny, and Trey Wassdorf. Applicant presented the direct testimony and attached exhibits of three professional engineers: Dr. Theodore Cleveland, Todd Stiggins, and Robert "Holly" Holder. Knox and Harrington were represented by attorney Marisa Perales, and they presented the direct testimony and attached exhibits of two professional engineers, Lawrence Dunbar and Cezary Saxon. The ED was represented by attorneys Anthony Tatu and Mattie Isturiz, who offered the direct testimony and attached exhibits of one professional engineer, Chandra Yadav. Attorney Pranjal Metha represented the Office of Public Interest Counsel (OPIC) and did not provide any direct testimony, witnesses, or exhibits.

For the reasons set out below, the ALJ concludes that the evidentiary record supports the issuance of the Draft Permit, and therefore, recommends that the Application be granted.

[1] Diversity Trucking did not participate in the remand hearing.

I. NOTICE, JURISDICTION, AND PROCEDURAL HISTORY ON REMAND[2]

The Initial PFD was issued in this matter on September 13, 2022, recommending denial of the Application. The Commission considered the Initial PFD at an open meeting held on December 14, 2022, and determined that this matter should be remanded to the State Office of Administrative Hearings (SOAH) to take additional evidence on whether the Applicant has provided a sufficient surface water drainage report.

The Commission's interim order remanding this proceeding (Interim Order) also set a deadline for the maximum duration of the hearing at 180 days from the date of the remand to the date the supplemental PFD is issued. The parties proposed an agreed procedural schedule, which was adopted by the ALJ.[3]

The preliminary hearing on remand was held on February 6, 2023, via Zoom videoconference. A hearing on the merits on remand (Remand Hearing) convened via Zoom videoconference on April 3-6, 2023. The record closed on April 28, 2023, after the parties submitted their final closing arguments and proposed findings of fact and conclusions of law.

[2] The procedural history prior to the remand is set forth in the Initial PFD.

[3] *See* Order Memorializing Procedural Schedule on Remand (February 14, 2023).

II. BURDEN OF PROOF

The Application was filed after September 1, 2015, and the TCEQ referred it under Texas Water Code section 5.556, which governs referral of environmental permitting cases to SOAH based on a request for a contested case hearing.[4] Therefore, this case is subject to Texas Government Code section 2003.047(i-1)-(i-3),[5] which provides:

> (i-1) In a contested case regarding a permit application referred under Section 5.556 . . . [of the] Water Code, the filing with [SOAH] of the application, the draft permit prepared by the executive director of the commission, the preliminary decision issued by the executive director, and other sufficient supporting documentation in the administrative record of the permit application establishes a prima facie demonstration that:
>
> (1) the draft permit meets all state and federal legal and technical requirements; and
>
> (2) a permit, if issued consistent with the draft permit, would protect human health and safety, the environment, and physical property.
>
> (i-2) A party may rebut a demonstration under Subsection (i-1) by presenting evidence that:

[4] Tex. Water Code §§ 5.551(a), .556.

[5] Acts 2015, 84th Leg., R.S., ch. 116 (S.B. 709), §§ 1 and 5, eff. Sept. 1, 2015.

(1) relates to . . . an issue included in a list submitted under Subsection (e) in connection with a matter referred under Section 5.556, Water Code; and

(2) demonstrates that one or more provisions in the draft permit violate a specifically applicable state or federal requirement.

(i-3) If in accordance with Subsection (i-2) a party rebuts a presumption established under Subsection (i-1), the applicant and the executive director may present additional evidence to support the draft permit.

Although this law creates a presumption, sets up a method for rebutting that presumption, and shifts the burden of production on that rebuttal, it does not change the underlying burden of proof. Accordingly, the burden of proof remains with the Applicant to establish by a preponderance of the evidence that the Application would not violate applicable requirements and that a permit, if issued consistent with the draft permit, would protect human health and safety, the environment, and physical property.[6]

In this case, the Application, draft permit, and other materials listed in Texas Government Code section 2003.047(i-1) (collectively, the prima facie demonstration) were offered and admitted into the record at the initial hearing.

[6] 30 Tex. Admin. Code § 80.17(a), (c).

III. ANALYSIS OF REFERRED ISSUE: SUFFICIENCY OF THE SURFACE WATER DRAINAGE REPORT

The TCEQ referred one issue to SOAH for the remand hearing: Whether the Applicant has provided a sufficient surface water drainage report.[7] TCEQ rules relating to drainage analysis require an Applicant to (1) verify that existing draining patterns will not be adversely altered by the proposed landfill and (2) include hydraulic calculations and designs for the necessary collection, drainage, and detention facilities (that is, the infrastructure proposed to ensure the existing drainage patterns will not be adversely altered). Applicant and the ED maintain that these requirements have been appropriately met. Protestants argue that Applicant failed to comply with both requirements, and OPIC agrees.

1. Applicable Law

Under the TCEQ's rules, a Surface Water Drainage Report must demonstrate that the owner or operator will design, construct, maintain, and operate the landfill to manage run-on and runoff during the peak discharge from at least a 25-year storm and prevent the off-site discharge of waste and contaminated stormwater;[8] provide structures to collect and control at least the water volume resulting from a

[7] Issue M from the Commission's Interim Order.

[8] 30 Tex. Admin. Code §§ 330.63(c), .303(a).

24-hour/25-year storm;[9] protect the landfill from washouts;[10] and demonstrate that the existing drainage pattern is not adversely altered.[11]

The predominant requirement for surface water drainage is that existing drainage patterns must not be adversely altered.[12] This requirement means that existing drainage patterns must be accurately characterized so that pre- and post-development drainage patterns can be compared. To conduct this comparative analysis, an applicant must determine what the surface water drainage patterns are for existing conditions at the site, so that it can compare those existing conditions to the proposed surface water drainage conditions after the landfill is fully developed. According to the TCEQ regulatory guidance, the existing drainage patterns of the site are intended to provide: "(1) a baseline for comparison with the post-development drainage patterns of the facility and (2) a basis for the demonstration that the existing drainage patterns will not be adversely altered."[13]

TCEQ rules state that the where, as here, the applicant is analyzing drainage characteristics for areas of 200 acres or less, the calculations must follow the Rational

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[9] 30 Tex. Admin. Code § 330.305(c).

[10] 30 Tex. Admin. Code § 330.307(b).

[11] 30 Tex. Admin. Code § 330.305(a).

[12] *See* 30 Tex. Admin. Code §§ 330.63(c)(1)(C), (D)(iii), and .305(a).

[13] Knox Ex-15 at 4 (from Initial Hearing).

Method.[14] The rules also allow the applicant to use "equivalent or better methods approved by the executive director."[15] There is no corresponding rule mandating a particular method to calculate volume of storage.

To determine existing surface water drainage conditions, TCEQ's Surface Water Drainage and Erosional Stability Guidelines for a Municipal Solid Waste Landfill (Guidelines) "provide[] recommended procedures and suggestions for preparing a surface water drainage report."[16] They state that the applicant "must include a point-by-point analysis of the surface water drainage conditions to demonstrate that existing drainage patterns will not be adversely altered (consistent with 30 [Texas Administrative Code sections] 330.63(c)(1)(C) and 330.305(a)) for landfills"[17] and prescribe a five-step exercise:

1. Determine the specific discharge points for the runoff with respect to existing conditions at the permit boundary. Discharge points include the locations where storm water runoff leaves the permit boundary by open channel flow, overland flow, flow through hydraulic structures, etc.

2. Determine drainage subareas and calculate the peak flow rates for existing conditions for each of the discharge points.

[14] 30 Tex. Admin. Code § 330.305(f)(1).

[15] 30 Tex. Admin. Code § 330.305(f)(1).

[16] Ex. Knox-15 at 2 (emphasis added).

[17] Ex. Knox-15 at 3.

3. Calculate the volume of the runoff for the design storm event for each of the discharge points for existing conditions.

4. Determine the velocity of the peak runoff at each of the discharge points for existing conditions.

5. Determine the areas offsite that contribute flows onto the permit boundary (run-on), and calculate the peak flow rate, velocity, and volume of run-on from each offsite area onto the site for existing conditions.[18]

Then, these five steps must be repeated for the proposed fully developed landfill conditions.[19] The applicant must compare the peak flow rate, velocity, and volume under existing conditions with peak flow rate, velocity, and volume under fully developed landfill conditions, to ensure that drainage patterns will not be adversely altered.[20]

Next, to ensure that the proposed landfill development will not adversely alter existing drainage patterns, an applicant must locate, calculate, and design necessary collection, drainage, and detention facilities.[21] The 25-year, 24-hour storm event must be used to calculate and design these drainage structures.[22] The permit

[18] Knox Ex-15 at 3 (from Initial Hearing).

[19] Knox Ex-15 at 3 (from Initial Hearing).

[20] Knox Ex-15 at 3 (from Initial Hearing).

[21] Knox Ex-15 at 5 (from Initial Hearing).

[22] Knox Ex-15 at 9 (from Initial Hearing); 30 Tex. Admin. Code §§ 330.63(c)(1)(D)(i), .305(b)-(d)(1).

application must include the hydraulic calculations and designs for the necessary collection, drainage, and/or detention facilities (that is, the infrastructure that is intended to ensure that existing drainage patterns will not be adversely altered by the landfill development).[23]

2. Disputed Issues

On remand, the parties address two issues: (1) whether the Applicant correctly analyzed peak flow under existing conditions[24] and (2) whether the detention ponds are sized correctly. Both issues underlie whether the Applicant properly verified that existing drainage patterns would not be adversely altered by the proposed landfill.

Regarding peak flow under existing conditions, Protestants argue that Applicant failed to calculate peak flow at discharge points where the runoff will occur at the permit boundary, as required by the Guidelines. OPIC agrees. Applicant maintains that it has met its burden of proof on the issue of adequately and properly calculating peak flows under existing conditions, and the ED agrees.

Turning to the size of the detention ponds, Protestants maintain that the ponds are undersized and incorrectly designed because (1) they were not designed

[23] 30 Tex. Admin. Code §§ 330.63(c)(1), .305.

[24] Protestants maintain that Applicant inaccurately calculated velocity and volume for existing conditions. They rely upon the evidence presented at the Initial Hearing in support of their position. The arguments and evidence for the remand hearing focus on peak flow rates.

using a 25-year, 24-hour storm and (2) they were designed using a uniform rainfall distribution. OPIC also agrees. Applicant contends that it has met its burden of proof on the issue of pond sizing, and the ED agrees.

The ED concluded that the weight of the evidence in the record supports a finding that Applicant has met its burden of proof on the issue of whether it has provided a sufficient surface water drainage plan.[25] The ED found the Application, including the drainage report, provided discussions and detailed designs, calculation, and operational considerations for the collection, control, and discharge of storm water as required by the applicable rules, and issued a Draft Permit (which, it argues, should be approved).

3. Application Drainage Analysis and Remand Evidence in Support

The Application addresses the requirements for assessment of drainage patterns in Attachment C, Part III. Attachment C shows runoff velocities for both existing and developed conditions were calculated by taking the length of the shallow concentrated flow in feet and dividing it by the time of concentration in seconds.[26] Runoff volumes for existing and developed conditions were calculated by

[25] The ED's remaining evidence and argument is included, where applicable, throughout the remainder of the PFD, but it is not set forth in separate sections because it otherwise summarizes the applicable rules and evidence.

[26] Ex. Applicant-2000 at 5. Mr. Stiggins defines "time of concentration" as "the time in minutes that it would take for any water that falls at the most hydraulically remote point of the drainage area to reach the outlet of the drainage area . . . overall it could be defined as the amount of time it takes for the entire drainage area to contribute to the runoff." Tr. Vol. 3 at 12-13.

multiplying the time of concentration by the peak discharge rate.[27] Mr. Stiggins testified that in comparing existing conditions to post-development conditions in order to determine if there would be an adverse impact on drainage, he had to look at the peak flow rate, the velocities, the volumes, and the behavior of the water—how it flows on the site and as it leaves the site.[28]

In preparing the Application, Mr. Stiggins began by delineating surface water drainage areas representing the drainage patterns on the property as it exists pre-development. This exercise resulted in five Drainage Areas, each less than 200 acres, designated with letters "A" through "E."[29] Each drainage area was also assigned a corresponding Comparison Point (also "A" through "E"), which represents the point at which the longest possible flow path within the drainage area intersects with the property boundary[30]—it is used to calculate the time of concentration, which, in turn, is used to calculate rainfall intensity (an element of the Rational Method equation).[31] Applicant maintains that the Comparison Points are not discharge points. Because the designated drainage areas are less than 200 acres, Mr. Stiggins used the Rational Method to calculate peak flows for both pre- and post-development

[27] Ex. Applicant-2000 at 6.

[28] Tr. Vol. 3 at 32.

[29] Ex. Applicant -2000 at 2; *see also* Application Vol. 2, Part III, Att. C, App. III.C.1, Figure III.C.1.1.

[30] Ex. Applicant-3000 at 2.

[31] The relevant points for purposes of this PFD are Comparison Points A and B because the corresponding Drainage Areas A and B are the two delineated drainage areas along the eastern permit boundary, which is where the drainage occurs under both existing and post-development conditions.

conditions, as required by statute.[32] Mr. Stiggins calculated peak flow for existing conditions from Drainage Area A at 65 cubic feet per second (cfs) at Comparison Point A and peak flow from Drainage Area B at 54 cfs at Comparison Point B. These numbers represent the summation of the peak flows from each Drainage Area rather than the distributed peak flows along the boundary.

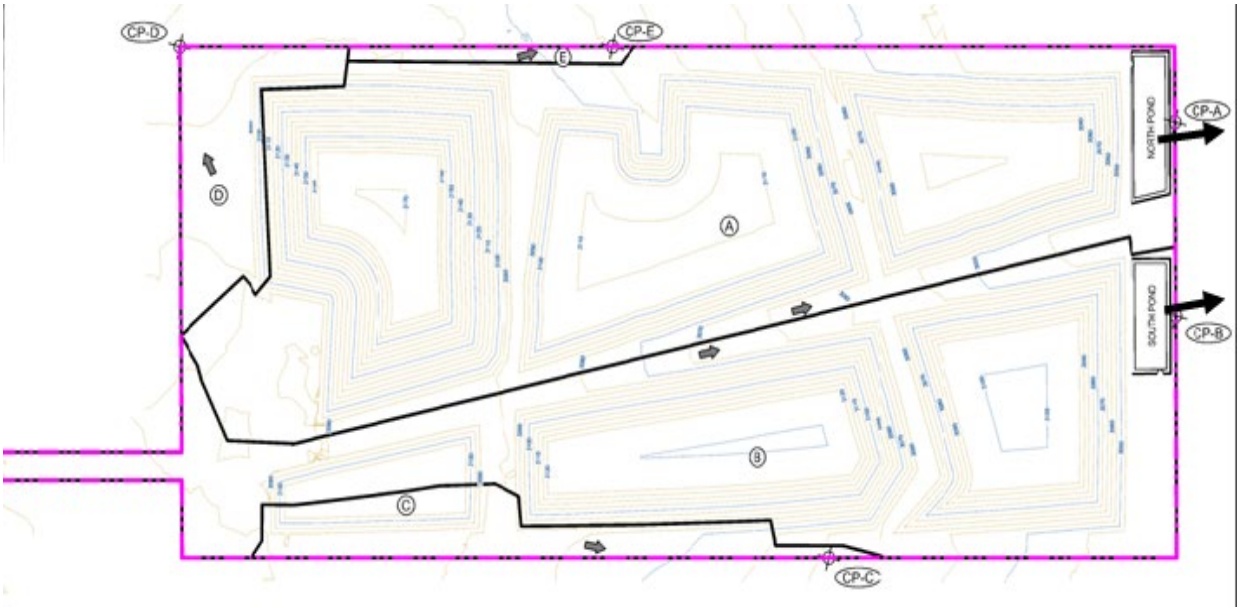

Figure 1 – Application Figure III.C2.1 showing the drainage areas, Comparison Points, and North and South Ponds

Dr. Cleveland, Applicant's expert witness on remand, created a Storm Water Management Model (SWMM) to verify the results of the Rational Method equation used in the Application's Surface Water Drainage Report.[33] More specifically, he

[32] 30 Tex. Admin. Code § 330.305(f)(1).

[33] Ex. Applicant-1000 at 5; Tr. Vol. 1 at 44.

was tasked with verifying Applicant's results from the Rational Method equation, as reflected in the Surface Water Drainage Report.[34] In doing so, he developed SWMM model using the same values that were used in the Application.[35] Dr. Cleveland explained that the program allows for approximation of distributed flow behavior, which is information the Rational Method does not provide.[36] Accordingly, he was able to calculate the peak flow of the discharges leaving the site at each of the cells in his SWMM model along the drainage perimeters.[37] This model showed peak flow rates for each of the 334-foot cells along the Drainage Area A and B boundaries ranged between 4.6 to 10.4 cfs.[38] Dr. Cleveland opined that his independent analysis verified the peak flow rates for existing conditions reflected in the surface water drainage report.[39] He acknowledged, however, that he did not adjust the site elevations while running the SWMM program to simulate the fully-developed landfill conditions.[40]

To develop the SWMM model, Dr. Cleveland used "the 24-hour, 25-year storm depth from NOAA Atlas 14, Volume 11" to "parameterize an SCS Type II

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[35] Tr. Vol. 1 at 44.

[35] Tr. Vol. 1 at 44.

[36] Tr. Vol. 1 at 45.

[37] Tr. Vol. 1 at 53.

[38] Tr. Vol. 1 at 54, 65, 67.

[39] Tr. Vol. 1 at 62.

[40] Tr. Vol. 1 at 86.

design storm, which is a standard procedure for generating rainfall hyetographs for use . . . in engineering and drainage design."[41] Dr. Cleveland explained that this model produces different rainfall intensities for different time blocks, which are then input into a model to generate a hydrograph, or a non-uniform rainfall distribution.[42]

The water exits the site, for the most part, along its eastern perimeter (where Drainage Areas A and B are located). This was illustrated and confirmed by Mr. Stiggins's Hydrological Engineering Center-River Analysis System (HEC-RAS) computer model, which was introduced at the Remand Hearing.[43] This model was used to create a two-dimensional simulation of stormwater runoff at the site to verify the drainage areas delineated in the Surface Water Drainage Report.[44]

The parties agree that under existing conditions, surface water runs off the site via overland flow, exiting the site in a diffuse manner rather than a channelized flow or defined discharge route.[45] When the landfill is developed, however, Applicant proposes to route surface water from two large drainage areas (Drainage Area A and Drainage Area B) to two detention ponds (the North Pond and South Pond), where it will be discharged at the permit boundary over weirs (barriers across

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[41] Tr. Vol. 1 at 52.

[42] Tr. Vol. 1 at 153.

[43] Ex. Applicant-2002; Ex. Applicant-2000 at 4.

[44] Tr. Vol. 2 at 74:19-22, 77:14-25.

[45] Knox Ex-200 at 5; *see also* Tr. Vol. 3 at 119-20.

the width of the pond to help control the flow of water).[46] The North Pond is designed with an 86-foot-wide weir and the South Pond uses a 71-foot-wide weir as the discharge structures.[47] Using the Rational Method, the peak flow rates for runoff flowing into the North Pond and South Pond are 177 cfs and 130 cfs, respectively.[48] The Application states that the peak flow rate leaving the North Pond is calculated as 65 cfs, while the peak flow rate leaving the South Pond is 54 cfs.[49]

Mr. Stiggins used the Modified Rational Method to calculate the volume of storage needed to mitigate surface water drainage from pre-development to post-development conditions for any duration of a 25-year frequency storm.[50] The Modified Rational Method is an equation that was developed as a tool to calculate total runoff volumes occurring during storms with durations longer than the time of concentration of a given drainage area, and it is capable of calculating what duration of storm would create the maximum volume of runoff to be managed.[51] It uses a uniform rainfall distribution. This method was accepted for this Application by the ED.[52] Applicant clarified that Mr. Stiggins selected the Modified Rational Method

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[46] Tr. Vol. 3 at 120.

[47] Application, Part III, Att. C, Table III.C.H.

[48] Application, Part III, Att. C, Table III.C.E.

[49] Application, Part III, Att. C, Table III.C.H.

[50] Ex. Applicant-2000 at 17 (from Initial Hearing); *see also* Tr. Vol. 2 at 89-90.

[51] Ex. Applicant-2000 at 6.

[52] Initial Hearing Tr. Vol. 4 at 138, 144-45.

(to calculate volume) to maintain consistency with the mandated Rational Method (to calculate peak flow) calculations.[53]

The ED found the Application, including the drainage report, provided discussions and detailed designs, calculations, and operational considerations for the collection, control, and discharge of storm water as required by the applicable Rules.

4. Peak Flow Under Existing Conditions

Protestants' challenge relating to peak flow under existing conditions rests on their contention that Applicant failed to produce evidence of the peak flow at specific discharge points for the runoff at the permit boundary. Protestants do not dispute that:

1. The Rational Method was appropriate to calculate the peak flow rates;
2. Applicant's inputs into the Rational Method equation were appropriate;
3. Water discharges from the site, under existing conditions, via overland diffuse flow, not via channelized flow; and
4. Applicant calculated a peak flow rate of 65 cfs for Drainage Area A, under existing conditions, and a peak flow rate of 54 cfs for Drainage Area B, under existing conditions.

[53] Ex. Applicant-2000 at 6.

a) Protestants' Evidence and Position

Protestants maintain that Applicant overestimated peak flow rates for existing conditions at its designated Comparison Points, rendering the results of its comparison to fully developed landfill conditions unreliable and inaccurate.

During the Initial Hearing on the merits, Protestants' expert witness Larry Dunbar explained that Applicant correctly calculated peak flow rates for its designated drainage areas, using the Rational Method equation, but erroneously applied the results from that equation to a single comparison point for each of the drainage areas delineated by the Applicant (that is, Comparison Points A and B). Thus, the peak flows attributed to the Comparison Points for existing conditions for each of the drainage areas were too high because flows are not actually discharging at the designated Comparison Points at the peak flow rates calculated by Applicant. Mr. Dunbar estimated the likely peak flow rates for existing conditions along the permit boundary where the detention pond weirs are proposed. He used a ratio to calculate that portion of the flow that discharges offsite across the weir along the permit boundary for the proposed North Pond and South Pond, and his calculation resulted in less than 5 cfs for existing conditions for Drainage Areas A and B.

Protestants maintain that the additional evidence presented by Applicant on remand fails to support Applicant's representations of the peak flow rates under existing conditions at the site. They argue that neither Dr. Cleveland's SWMM model nor Mr. Stiggins's HEC-RAS model demonstrate that the peak flow rate at

Comparison Point A is 65 cfs or that the peak flow rate at Comparison Point B is 54 cfs under existing conditions. Indeed, Protestants contend that Applicant's remand evidence supports the position that its calculated peak flows for existing conditions overestimate the actual flow conditions at the site and fail to provide a reliable baseline for purposes of comparing existing conditions to fully-developed conditions. Essentially, Protestants posit that peak flow rates, under existing conditions, are much lower at Comparison Point A and Comparison Point B than the peak flow calculated by Applicant; thus, when compared to the peak flow rates under fully-developed conditions at these two locations, it is apparent that the proposed landfill will adversely alter existing drainage patterns.

(i) Dr. Cleveland's Testimony

Protestants argue that Applicant witness Dr. Cleveland's testimony supports their position that peak flow rates at Comparison Point A and B are much lower than the 65 cfs and 54 cfs calculated by Applicant.

Protestants argue the Application does not provide the peak flow rate for any specific point along the drainage areas' boundaries. Protestants proffer that Dr. Cleveland's SWMM model provides a better estimate of the peak flows leaving the permit boundary via overland flow because the program allows a modeler "to

approximate distributed flow behavior, whereas the Rational Method does not allow you to proximate distributed flow behavior."[54]

Protestants highlighted that Dr. Cleveland testified that the Rational Method calculates the peak flows for a contributing drainage area but does not provide information regarding where those flows are occurring or at what point along the boundary those flows are discharging.[55] Moreover, according to Dr. Cleveland, if water were actually discharging from Drainage Area A at 65 cfs at Comparison Point A, there would be substantial erosion features evidencing this flow.[56] And, in fact, the parties agree the water discharges along the drainage area boundaries as overland flow.

Protestants also emphasize that Dr. Cleveland's SWMM model showed peak flow rates for each of the 334-foot cells along the Drainage Area A and B boundaries ranged between 4.6 to 10.4 cfs.[57] Moreover, they proffer, Dr. Cleveland testified that an estimate of the peak flow rate along the width of the weir for the North Pond (an 86-foot boundary versus the 334-foot cell boundary), would be even smaller.[58] Protestants contend that Dr. Cleveland was unable to explain why 65 cfs is the

[54] Tr. Vol. 1 at 44-45.

[55] Tr. Vol. 1 at 71.

[56] Tr. Vol. 1 at 39.

[57] Tr. Vol. 1 at 54, 65, 67.

[58] Tr. Vol. 1 at 60.

appropriate peak flow rate to use for purposes of establishing the existing condition at the Comparison Points.

(ii) Mr. Stiggins's Testimony

Protestants next maintain that the only other new evidence Applicant offered at the Remand Hearing, Mr. Stiggins's HEC-RAS model, only demonstrates the direction of surface water flows and does not verify or compare the peak flow rates computed by the Rational Method equation.[59] Protestants argue that the HEC-RAS model *could* have provided the peak flow rates for the water as it exits the drainage boundaries via diffuse overland flow, but Mr. Stiggins elected not to run the model at that level of detail.[60] In fact, Mr. Stiggins explained that he did not need to determine what the peak flow rates are for existing conditions at the Comparison Points because they do not represent discharge points—there is no single point discharge.[61] Mr. Stiggins testified that the engineer can select the discharge point at his or her discretion because it is a reference point for the direction of flow.[62] Protestants argue that this explanation of his Comparison Points is at odds with TCEQ's regulations and Guidelines. They contend that the Guidelines instruct Applicant to identify "specific" discharge points where surface water exits the site,

[59] Tr. Vol. 2 at 77-78; 68-70.

[60] Tr. Vol. 2 at 69.

[61] Tr. Vol. 2 at 112.

[62] Tr. Vol. 3 at 63

even if the surface water exits via overland flow. Then, they argue that Applicant must calculate peak flows occurring under existing conditions at those specific discharge points.[63] Protestants maintain that Mr. Stiggins failed to do this.[64]

(iii) Mr. Saxon's Testimony

To rebut Applicant's prima facie demonstration, Protestants offered the testimony of Mr. Saxon, an engineer with experience in the Rational Method, designing detention ponds, analyzing surface water hydrology for purposes of designing hydrologic infrastructure, and developing and running various hydrologic models and programs. Mr. Saxon opined that although he does not agree with all the inputs Dr. Cleveland used for the SWMM model, he does agree that the SWMM model gives a "better idea of the peak flow rates that occur in a diffuse manner along the permit boundary than the point discharge peak flow rates that Mr. Stiggins calculated using the Rational Method."[65]

Mr. Saxon also opined that although Mr. Stiggins properly calculated the peak flow rates, he improperly represented that the peak flow rates occur at specifically

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[63] Knox Ex.-15 at 3.

[64] Protestants also argue that Mr. Stiggins could have analyzed existing drainage conditions in a manner that would have allowed him to determine peak flow rates at specific discharge points along the drainage area boundaries, but he elected not to do so. For example, he could have used a method other than the Rational Method, delineated smaller drainage sub-areas and applied the Rational Method to those areas, or determined what portion of the calculated 65 cfs exists the site at Comparison Point A.

[65] Knox Ex.-300 at 14.

identified discharge or comparison points along the permit boundary. Mr. Saxon testified that Mr. Stiggins computed peak flows at Comparison Points A and B as if all of the runoff from his two drainage areas naturally drain to these two points.[66] However, in reality, the runoff leaves the permit boundary in a diffuse manner at various locations all along the boundary and only a small portion of the calculated runoff actually leaves the property at the locations where the detention ponds will be discharging.[67] Therefore, Mr. Saxon concludes, Mr. Stiggins's peak flows for existing conditions at the Comparison Points are too high.[68]

Protestants contend that Mr. Saxon's testimony is consistent with Dr. Cleveland's testimony—that the points of interest for comparison of existing and post-development conditions are along the weirs where the water will leave under post-development conditions. Essentially, Mr. Saxon maintains that Applicant must provide a reliable estimate of the peak flows that are occurring under existing conditions at whatever comparison point they decide to use for purposes of comparing conditions. Because the runoff will leave at the location of the proposed pond weirs, Applicant needed to determine the peak flow rates occurring under existing conditions at the location of the proposed pond weirs, and Applicant failed to do this.

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[66] Knox Ex.-300 at 7.

[67] Knox Ex.-300 at 7.

[68] Knox Ex.-300 at 7.

(iv) Mr. Dunbar's Testimony

Mr. Dunbar testified at the Initial Hearing that because Applicant significantly overestimated peak flows for existing conditions, it could not provide a reliable and accurate comparison of existing conditions to post-development conditions. Without such a comparison, Applicant could not prove that existing drainage patterns would not be adversely altered by the proposed landfill.[69] More specifically, Mr. Dunbar explained that although Applicant correctly calculated peak flow rates for its designated drainage areas using the Rational Method equation, it erroneously applied the results from that equation to a single comparison point (the Comparison Points) for each of the drainage areas delineated by Applicant. Therefore, Mr. Dunbar opined, the peak flows attributed to the Comparison Points for existing conditions were too high--flows are not currently discharging at the Comparison Points at the peak flow rates calculated by Applicant.[70]

At the Initial Hearing, Mr. Dunbar also provided an estimate of what the peak flow rates are likely to be at the Protestants' (and OPIC's) proffered points of comparison (*i.e.,* along the weirs from which flows are intended to discharge from the detention ponds). To roughly estimate the flow, he used a ratio to determine the peak flows occurring under existing conditions along the permit boundary where the detention pond weirs are proposed to be located. For Drainage Area A, Mr. Dunbar

[69] Knox Ex.-400 at 4-5.

[70] Knox Ex.-400.

calculated the portion of the peak flow rate computed by Applicant for Comparison Point A that would discharge off the site across the 86-foot-wide area along the permit boundary where the proposed wier would be located. His calculations were less than 5 cfs.[71] He conducted a similar exercise for Drainage Area B, and his calculation also resulted in less than 5 cfs for existing conditions.[72]

Protestants posit that the new evidence provided by Applicant on remand did not impact Mr. Dunbar's opinions. In fact, Protestants argue, Dr. Cleveland's testimony supported Mr. Dunbar's opinions.[73] They contend, moreover, the HEC-RAS model also supported Mr. Dunbar's position that flows exit the site via diffuse overland flows, not at certain discharge points.[74]

b) Applicant's Evidence and Position

Applicant emphasizes that the Rational Method is not designed to calculate peak flow from a specific point of discharge; rather, it calculates the peak discharge from a given drainage area as a whole.[75] This is a limitation because Applicant must know other characteristics of the site to accurately analyze surface water drainage.

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[71] Tr. Vol. 2 at 64-65 (from Initial Hearing). Mr. Dunbar explained how he came up with his estimated peak flow rates for Comparison Point A and Comparison Point B discharges under existing conditions.

[72] Knox Ex.-200 at 12.

[73] Knox Ex.-400 at 3. *Compare with* Tr. Vol. 1 at 68, 72.

[74] Knox Ex.-400 at 8-9; *see also* Tr. Vol. 3 at 141-146.

[75] Ex. Applicant-3000 at 2:28-29.

Applicant maintains that because of this limitation, Mr. Stiggins evaluated the topography of the site over the course of multiple visits in order to determine the likely direction and characteristics of surface water flow.[76] Mr. Stiggins observed that, based on the overall effect of the features, the surface water flow under existing conditions exits Drainage Areas A and B predominantly across the eastern boundary of the site. This was confirmed by Mr. Stiggins's HEC-RAS model and Dr. Cleveland's observations at the site.[77] Therefore, Applicant's goal of avoiding adverse alteration to drainage patterns required maintaining similar levels of discharge across the eastern boundary. Mr. Stiggins designed the detention ponds and outflow structures to satisfy this goal.

The TCEQ rules require Applicant to use the Rational Method to assess drainage characteristics for areas of 200 acres or less. Additionally, Mr. Stiggins testified that the site's characteristics are favorable for the use of the Rational Method[78] and that he previously "designed and constructed other landfill drainage systems using the Rational Method and observed that they functioned as intended."[79] Dr. Cleveland agreed that the Rational Method is "a mature empirical methodology for estimating peak runoff rates" that consistently produces adequate

[76] Tr. Vol. 2 at 52:14-17.

[77] Ex. Applicant-4000 at 3; Ex. Applicant-1000 at 10.

[78] Ex. Applicant-3000 at 1.

[79] Ex. Applicant-3000 at 2.

results for drainage areas less than 200 acres.[80] Dr. Cleveland further testified that Applicant was justified in selecting the Rational Method,[81] and that it was correctly applied in this situation.[82] With regard to the Surface Water Drainage Report, Dr. Cleveland also confirmed that Mr. Stiggins utilized correct inputs and performed the calculations correctly using the Rational Method.[83] Moreover, Dr. Cleveland's independent modeling corroborated the Rational Method calculations with respect to peak flow rates along the property boundary.[84] Dr. Cleveland testified that the distributed discharges "sum up to a value of approximately 65 cfs" in his SWMM model, which is the number Mr. Stiggins calculated using the Rational Method.[85] Dr. Cleveland testified more specifically that the SWMM model showed that discharges leaving the property range from 4.6 to 8.6 cfs along each cell edge (which is 334 feet in length).[86]

Applicant also maintains that Protestants' evidence offered is "riddled with misrepresentations, inaccuracies and inconsistencies."[87] First, Applicant argues that

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[80] Ex. Applicant-4000 at 2.

[81] Ex. Applicant-1000 at 4.

[82] Ex. Applicant-1000 at 4-5.

[83] Ex. Applicant-1000 at 5.

[84] Ex. Applicant-1000 at 5.

[85] Ex. Applicant-1000 at 5.

[86] Ex. Applicant-1000 at 5.

[87] Applicant's Closing Arguments at 9.

Mr. Saxon's testimony misrepresented the Rational Method as calculating the peak flow rate *at* the Comparison Points, "as if all of the runoff from [Drainage Areas A and B] naturally drain to these two points."[88] Applicant explains that the Rational Method simply calculates peak discharge from a given drainage area. It is agnostic to flow patterns and discharge points. Moreover, Applicant maintains that the comparison point is *not* a discharge point. It represents the point at which the longest possible flow path within the drainage area intersects with the property boundary[89] and is used to calculate the time of concentration. Indeed, Mr. Saxon testified that the Rational Method does not calculate the particular location of runoff in existing conditions.[90] Mr. Saxon also testified that the width of overland flow (or, as Applicant explains, the length of a property boundary that is being crossed by overland flow) is not an element of the Rational Method equation.[91]

Next, Applicant contends that Mr. Dunbar also wrongly claimed that the computed peak flows for Drainage Areas A and B are occurring *at* Comparison Points A and B, respectively. Applicant argues that Mr. Dunbar's division of the calculated peak flows from Drainage Areas A and B by the length of the property boundaries is also misguided because the width of flow is not an element of the Rational Method calculation. This division, Applicant argues, essentially applies a

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[88] Knox Ex.-300 at 7.

[89] Ex. Applicant-3000 at 2.

[90] Tr. Vol. 3 at 120.

[91] Tr. Vol. 3 at 122.

ratio comparing the length of the property boundary in existing conditions to the width of the weir in developed conditions, which is not a recognized methodology.[92] Applicant contends that the result of this altered methodology would be a reduction of pre-development flows by a factor of over ten times, potentially creating an adverse impact to drainage conditions.[93] Applicant also points out that Mr. Dunbar's testimony as to the length of the permit boundaries varied without any apparent basis in the topography of the site and that his methodologies were not apparent anywhere in his pre-filed testimony.[94]

c) OPIC's Position

OPIC concludes that Applicant did not accurately characterize the existing drainage patterns to provide a baseline condition for comparison with the post-development drainage patterns. OPIC agrees that the baseline condition for comparison is the existing overland flow and that the weirs are designed to limit and meter the flow to match the peak flow that leaves by overland flow under the existing conditions.[95] However, OPIC maintains that the peak flow leaving by overland flow under the existing conditions is not measured by Mr. Stiggins at the perimeter of the proposed North and South Pond weirs.

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[92] Tr. Vol. 2 at 101; 103.

[93] Ex. Applicant-3000 at 4.

[94] Ex. Applicant-2000 at 9; Ex. Applicant-1000 at 6.

[95] Tr. Vol. 2 at 114; Tr. Vol. 4 at 115.

OPIC notes that TCEQ rules do not require an applicant to only use the Rational Method, but rather allow an applicant to use equivalent or better methods for peak discharge calculations.[96] Moreover, Mr. Stiggins testified that the drainage areas could have been further divided into smaller areas to apply the Rational Method and that he did not perform that analysis.[97]

In addition, OPIC argues that it is not convinced, as Mr. Stiggins testified, that peak flows are just one element of the baseline condition to compare with the post-development conditions (along with the behavior of water on the site, the receiving area for the discharged water, and other variables like velocities and volumes).[98] OPIC supports Protestants' approach to consider the peak flow rates as they leave the same area under both existing and proposed conditions because it would provide a more appropriate baseline for comparison.

d) ALJ Analysis on Peak Flow for Existing Conditions

TCEQ Rule 330.305 outlines surface water drainage requirements for landfills. Where, as here, the relevant drainage area is 200 acres or less, subsection (f)(1) of that rule mandates that calculations must follow the Rational Method when

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[96] 30 Tex. Admin. Code § 330.205(f)(1).

[97] Tr. Vol. 4 at 12.

[98] Tr. Vol. 3 at 31, 32.

assessing the existing and proposed drainage characteristics of the facility. The rule also allows the owner to use "equivalent or better methods approved by the executive director."[99]

In addition, the TCEQ Guidelines "provide[] *recommended* procedures and *suggestions* for preparing a surface water drainage report."[100] They state that the applicant "must include a point-by-point analysis of the surface water drainage conditions to demonstrate that existing drainage patterns will not be adversely altered (consistent with 30 [Texas Administrative Code sections] 330.63(c)(1)(C) and 330.305(a)) for landfills."[101] To accomplish this, the Guidelines mandate a five-step analysis for existing and proposed conditions, which includes determining specific discharge points for runoff at the permit boundary where storm water runoff leaves the permit boundary; determining drainage subareas and calculating peak flow rates for each of the discharge points; and determining the velocity of the peak runoff at each of the discharge points.

Here, Applicant used the Rational Method to calculate peak flow rates pursuant to the statutory requirement. It is undisputed that use of this method was appropriate. There is no dispute that Applicant's inputs into the Rational Method

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[99] 30 Tex. Admin. Code § 330.305(f)(1).

[100] Knox Ex.-15 at 2 (emphasis added).

[101] Knox Ex.-15 at 3.

equation were appropriate. There is no dispute as to the resulting calculations. Therefore, the crux of the dispute relating to peak flow is whether Applicant was required to calculate peak flow rates under existing conditions at specific discharge points along the permit boundary where the detention pond discharges are proposed to occur (in addition to calculating the sum of the peak discharge for a drainage area using the Rational Method). Applicant and the ED argue no. Protestants and OPIC contend that the Guidelines (and, thereby TCEQ) require this analysis, and Applicant failed to perform it.

Applicant maintains that it has met TCEQ requirements by applying the Rational Method and explained that the "discharge point" for the site is the eastern property boundary for both existing and post-development conditions. According to Applicant, nothing requires it to parse out additional points along the boundary where the proposed weirs are located, as Protestants and OPIC argue. The ED agrees that Applicant has accurately characterized existing drainage patterns. The ALJ also agrees that nothing requires Applicant to perform calculations or analyses other than those performed. This fact, coupled with the ED's approval of the sufficiency and accuracy of peak flow calculations for existing conditions, lead the ALJ to conclude that Applicant has met TCEQ requirements to calculate peak flow for existing conditions and provide a baseline for comparison with the post-development drainage patterns of the facility.

5. Pond Sizing

Second, Protestants argue that Applicant failed to demonstrate that its proposed detention ponds were designed for the 25-year, 24-hour storm and, therefore, failed to demonstrate that its ponds are adequately sized. Mr. Stiggins chose the Modified Rational Method to design the detention ponds, which takes into account uniform rainfall distribution. Mr. Stiggins explained that he chose this method to maintain consistency with the Rational Method. The ED approved Applicant's use of the Modified Rational Method. In addition, Dr. Cleveland confirmed that, in his opinion, Applicant was justified in using this method. Applicant's use of the Modified Rational Method, however, is contested by Protestants and OPIC for two related reasons—it uses a uniform rainfall distribution and fails to demonstrate that a 24-hour duration storm was used.

a) Applicant's Evidence and Position

As mentioned above, the detention ponds were designed using the Modified Rational Method, which takes into account uniform rainfall distribution.[102] Dr. Cleveland testified that Applicant was justified in using the Modified Rational Method, that the correct inputs were utilized, and that the results of the calculation were correct.[103] He further testified that the hydraulic analysis "supports the

[102] Application, Part III, Attachment C at III.C.2; Tr. Vol. 3 at 65.

[103] Ex. Applicant-1000 at 6.

conceptual sizing that resulted from use of the Modified Rational Method."[104] Moreover, as noted above, TCEQ's reviewing engineer, Mr. Yadav, testified that the TCEQ had approved the Modified Rational Method in the past, and that it was acceptable for this application.[105]

The Surface Water Drainage Report provides a volume calculation for the North Pond and the South Pond, taking into consideration storm durations from 10 to 110 minutes.[106] Mr. Stiggins explained that the Modified Rational Method assumes that the intensity of rainfall decreases as the duration of a storm increases.[107] He also testified that the equation takes into account the 25-year frequency storm even for all durations, once the critical volume is determined.[108] Shorter duration storms have higher intensities but produce less volume than longer duration storms due to their shorter duration.[109]

Applicant explains that the maximum required storage volume (or critical storage volume) is illustrated for both the North and South Ponds in Exhibit Applicant-3004. The 60-minute storm event (for the North Pond) and the 50-minute

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[104] Ex. Applicant-1000 at 6.

[105] Initial Hearing Tr. Vol. 4 at 144-145.

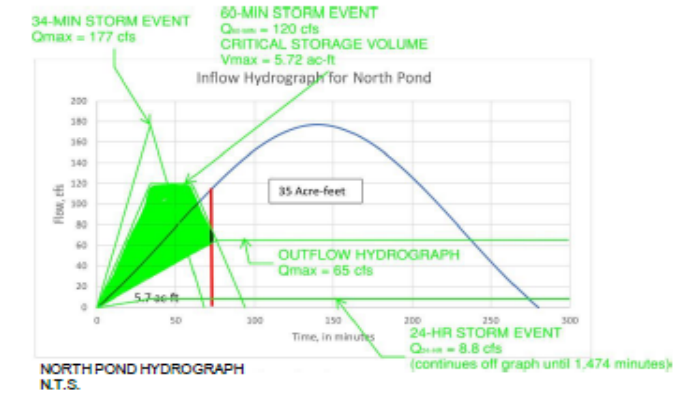
[106] Application, Part III, Attachment C at III.C-8.

[107] Tr. Vol. 3 at 75.

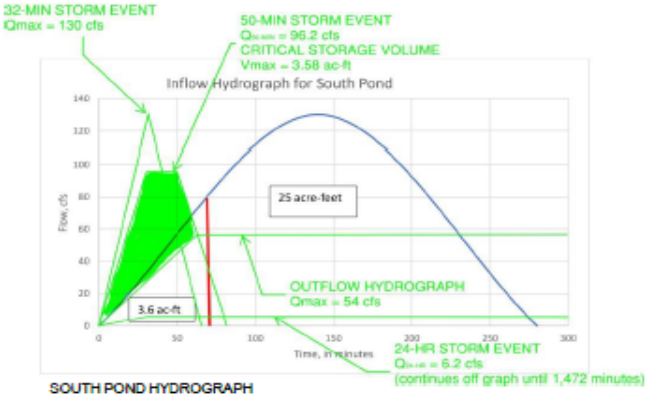
[108] Tr. Vol. 3 at 52.

[109] Tr. Vol. 3 at 77.

storm event (for the South Pond) would result in the same critical storage volume regardless of where these events are located on a 24-hour timeline. Applicant clarifies that low-intensity rain events producing low runoff rates will drain through the gabion-basket weirs (that is, during the low-flow conditions referred to in the Application). When the rain intensity spikes for a shorter duration, the ponds will retain water up to maximum required volumes, releasing it at a designated maximum of 65 cfs (and lower for the South Pond).



NORTH POND HYDROGRAPH
N.T.S.



SOUTH POND HYDROGRAPH
N.T.S.

NOTES:

1. "Inflow Hydrograph for North Pond" (SHOWN HERE AS "NORTH POND HYDROGRAPH") AND "Inflow Hydrograph for South Pond" (SHOW HERE AS "SOUTH POND HYDROGRAPH") OBTAINED FROM TESTIMONY BY LAWRENCE DUNBAR, P.E.

2. ADDITIONS TO ORIGINAL HYDROGRAPHS (ANNOTATED IN GREEN) ARE COMPLETED BY TODD E. STIGGINS, P.E. (TX#107769).

3. ADDITIONS DEPICT HYDROGRAPHS CREATED USING THE RATIONAL METHOD AND MODIFIED RATIONAL METHOD.

Remand Exhibit Applicant-3004
Solo Page

Applicant cites evidence showing it analyzed surface water for the 25-year, 24-hour rainfall event consistent with 30 Texas Administrative Code section

330.63(c)(1)(D)(i). First, the Application states as much.[110] The weir design section also contains references to a 25-year, 24-hour storm event.[111] The hydrology comparison section states that the detention ponds were sized to mitigate runoff flow rates, velocities, and volumes during a 25-year, 24-hour rainfall event.[112] Second, Mr. Stiggins's testimony in the Initial Hearing and the Remand Hearing reference the incorporation of the 25-year, 24-hour storm event.[113]

(i) 25-year, 24-hour Storm and Mr. Dunbar's Volume Calculations

Applicant takes issue with Mr. Dunbar's volume calculations. Mr. Dunbar testified at the Initial Hearing that the North Pond is designed for 5.7 acre-feet of water to be stored, but a 25-year/24-hour storm at the landfill site would yield about 30 acre-feet of stormwater runoff from the 103.9 acres for Drainage Area A, which would enter the North Pond.[114] He goes on to state that there is no outlet constantly discharging significant amounts of water during the filling-up of the pond; instead, gabion boxes are proposed. And, although there is no outflow information provided

[110] Application Vol. 2 at III.C-2.

[111] Application Vol. 2 (Rev. 04) at III.C-9 and C-10.

[112] Application Vol. 2 at III.C-10.

[113] Ex. Applicant-200 at 18: 19-20 (Initial Hearing); Ex. Applicant-2000 at 7.

[114] Knox Ex-200 at 14.

in the Application, gabion boxes are low-flow outlet structures to drain the pond.[115] Therefore, the pond will fill up and start overflowing the weir before the peak inflow of 177 cfs enters the pond, and there is not enough storage in the pond to reduce this peak inflow to Applicant's wrongly calculated existing peak flow rate of 65 cfs.[116] Mr. Dunbar testified that the same issue applies to the South Pond as well.[117]

Applicant first argues Mr. Dunbar did not develop his hydrographs using standard hydrologic protocols and that they were based on unreferenced methods. Therefore, Applicant argues that these hydrographs and resulting calculations are misleading. More specifically, Applicant maintains that although Mr. Dunbar claimed he utilized the "triangular hydrograph method" to prepare his figures,[118] the figures do not remotely resemble a hydrography prepared according to the referenced SCS triangular hydrograph method.[119] For example, Mr. Dunbar's figures do not include a specific, calculable term for the duration of rainfall excess. Also, the volume calculation for the SCS triangular hydrograph is completely different from those performed by Mr. Dunbar.[120] Mr. Dunbar testified that he first calculated the volume of runoff and then applied the peak flow as calculated by the

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[115] Knox Ex-200 at 14.

[116] Knox Ex-200 at 14.

[117] Knox Ex-200 at 14.

[118] Tr. Vol. 3 at 164.

[119] *See* Ex. Applicant-7001 at 2; Ex. Applicant-7002 at 2.

[120] *See* Ex. Applicant 7001 at 2.

Applicant occurring "in the center of the hydrograph."[121] Mr. Stiggins explained that this is an improper way to construct a hydrograph—it is backwards.[122]

Applicant also challenges Mr. Dunbar's dismissal of the time component in his hydrograph. Applicant posits that because Mr. Dunbar's hydrographs represent the entire depth (or volume) of a 25-year, 24-hour storm presenting itself to the detention ponds within a mere 5 hours (based on no time-related calculations whatsoever), they represent an extremely misleading and inaccurate opinion and should not be relied upon. Mr. Dunbar claimed that the hydrographs were intended to represent the "main part" of the inflow hydrograph.[123] However, Applicant argues that if the five-hour period around the peak were isolated from the rest of the graph (as Mr. Dunbar did), a substantial amount of runoff volume remains unrepresented in the graph. Applicant contends that this is apparent when Mr. Dunbar's hydrography is compared to Dr. Cleveland's pond inflow hydrograph from the SWMM model, which demonstrates inflow volume before and after the five-hour period around the peak. Mr. Stiggins opined that Mr. Dunbar's hydrograph does not represent the 24-hour duration storm, even though Mr. Dunbar used the depth from a 24-hour storm, which also correlates to the depth you would observe from a 500-year, two-hour storm.[124]

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[121] Tr. Vol. 3 157, 158.

[122] Tr. Vol. 4 at 62.

[123] Tr. Vol. 3 at 159.

[124] Tr. Vol. 4 at 58-59.

In addition, Applicant argues that Mr. Dunbar assumed an "unusually high" figure of 85% of the rain falling on the developed property as runoff.[125] This is almost double the estimate of runoff found in the Application, Applicant contends, and would be more representative of heavily developed urban areas covered by impermeable surfaces.[126]

(ii) Rainfall Distribution

Applicant used a uniform rainfall distribution to calculate runoff volume and dismisses Mr. Dunbar's contention that this was incorrect as unsupported by anything other than his own declarations. Mr. Stiggins testified that Chapter 330 rules do not require the use of a non-uniform distribution. Moreover, he testified, the rules require that the Rational Method, which assumes uniform distribution of the rainfall over the event be used for the Application.[127] Mr. Stiggins testified that attempting to "force the Rational Method to apply a bell shape [as a non-uniform rainfall distribution would appear] is inaccurate and invalid, unsupported by any academic research or documentation . . .To stay consistent with the calculations for

[125] Tr. Vol. 3 at 152; Ex. Applicant-2000 at 9.

[126] *See* Application Vol. 2 at III.C-3, Table III.C.A

[127] Ex. Applicant-3000 at 4.

peak flow from existing conditions he utilized the same uniform distribution of rainfall in the Modified Rational Method to calculate the volume of runoff."[128]

Similarly, Dr. Cleveland testified that "the use of the constant intensity (uniform distribution) by Mr. Stiggins is reasonable and appropriate for both the Rational Method and the Modified Rational Method."[129] He added, this is "what an engineer has to use for the Modified Rational Method."[130] Coaxing software into using a different distribution for purposes of the Modified Rational Method is possible but would be "outside the scope of general current engineering practice."[131]

b) Protestants' Evidence and Position

As an initial matter, Protestants pointed out that Mr. Stiggins testified that he had never used the Modified Rational Method for detention pond design before this permit application.[132] Additionally, Mr. Yadav testified that he had not reviewed a landfill permit application where the Modified Rational Method was used for the detention pond designs.[133] Similarly, Mr. Dunbar testified that all of the permit

[128] Ex. Applicant-3000 at 4.

[129] Ex. Applicant-4000 at 1-2.

[130] Tr. Vol. 1 at 114-15.

[131] Tr. Vol. 1 at 121-22.

[132] Tr. Vol. 3 at 15.

[133] Tr. Vol. 3 at 82.

applications he has reviewed used a variable rainfall distribution method for designs based on a 24-hour duration storm (and were methods other than the Modified Rational Method).[134]

(i) 25-year, 24-hour Storm

Protestants contend that even after remand it remains undisputed that Applicant's Surface Water Drainage Report failed to demonstrate that the detention ponds were designed based on the 25-year, 24-hour storm, as required. During the Initial Hearing, Mr. Stiggins presented two hydrographs that he created based on the information in the Application.[135] But, Protestants maintain, these hydrographs failed to demonstrate a 24-hour duration storm was used to design the ponds. Indeed, Mr. Stiggins testified at the Initial Hearing that the hydrographs did not reflect this duration because, in his opinion, they did not have to.[136] Mr. Dunbar testified at the Initial Hearing and demonstrated via a simplistic "triangle shape" hydrograph that the ponds as designed were undersized.[137]

Protestants argue that Applicant has failed to present any new evidence demonstrating that its detention ponds were designed based on the 25-year, 24-hour

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[134] Knox Ex.-400 at 9-10.

[135] Ex. Applicant-2004 (from the Initial Hearing). The Application did not include these hydrographs.

[136] Knox Ex.-12; Initial Hearing Tr. Vol. 3 at 124-25, 152-53.

[137] Initial Hearing Tr. Vol. 2 at 28-29, 36.

storm event. Instead, Protestants maintain, Applicant has attempted to justify its use of a uniform rainfall distribution method, which does not require *any* specific storm duration, for its detention pond designs. Because Applicant relied on the Rational Method for its existing conditions analysis, it used the Modified Rational Method, which requires use of a uniform rainfall distribution, to determine the volume for its detention pond designs. Protestants argue that Applicants therefore have not shown that the ponds were designed based on the 24-hour duration storm. More specifically, although TCEQ rules do not require the use of the Modified Rational Method, they do require that the detention ponds be designed based on the 24-hour storm, which Applicant failed to do.

(ii) Rainfall Distribution

In support of their position that Mr. Stiggins improperly used a uniform rainfall distribution, Protestants point to Dr. Cleveland's SWMM model. Protestants maintain that this model provided some useful information in demonstrating what a non-uniform 25-year, 24-hour rainfall distribution hydrograph looks like.[138] They highlight that Dr. Cleveland explained that this is a completely different method from that utilized by Mr. Stiggins.[139] Mr. Stiggins used a constant intensity storm for 110 minutes, which produced a trapezoidal-looking

[138] Protestants argue that Dr. Cleveland's SWMM model provided little useful information regarding Applicant's fully developed conditions and detention ponds because he failed to change the elevations at the site for fully developed conditions in his calculations.

[139] Tr. Vol. 1 at 116-17.

hydrograph.[140] Dr. Cleveland explained that with a uniform rainfall distribution, there is no need to continue calculating volume for storm events greater than 110 minutes because volumes required drop off proportionately as the duration of the storm gets longer.[141] Protestants emphasize that Dr. Cleveland's method produced more of a bell or gamma distribution,[142] like that produced by Mr. Dunbar.

Protestants also argue that their expert on remand, Mr. Saxon, confirmed what Mr. Dunbar explained during the Initial Hearing--that Applicant's detention ponds are undersized. Mr. Saxon prepared Exhibit Knox-304, relying on information supplied by Dr. Cleveland and Mr. Stiggins, to illustrate the difference in results from a uniform rainfall distribution and a variable rainfall intensity.[143]

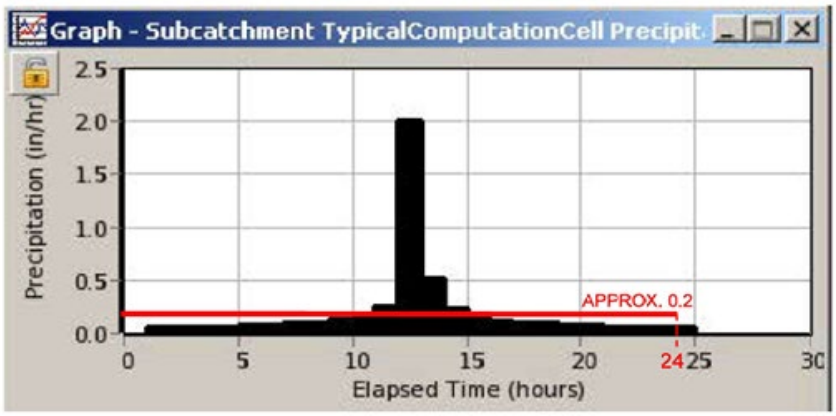

Exhibit Knox-304

[140] Tr. Vol. 1 at 116-117.

[141] Tr. Vol. 1 at 131.

[142] Tr. Vol. 1 at 116-117.

[143] Knox Ex.-304.

Protestants argue that this exhibit demonstrates how Mr. Stiggins's use of a uniform rainfall distribution produces results that are inconsistent with a variable rainfall distribution for a 24-hour duration storm and underestimates the volumes generated by such a storm.

In addition, Protestants maintain that Mr. Dunbar's opinions regarding the detention pond design remain accurate and substantiated by the evidence presented. Mr. Dunbar opined that all drainage facilities for landfill projects in Texas must meet TCEQ rules and distribute the total rainfall so as to produce a bell shape that varies over the 24 hours of the storm event (like his and Dr. Cleveland's models).[144] Mr. Dunbar pointed out that, on remand, Mr. Stiggins did not provide any new information indicating that the Application properly used the 25-year, 24-hour storm and that Dr. Cleveland's analysis would produce runoff volumes entering these the two detention ponds far in excess of what Mr. Stiggins assumed in the Application.[145]

Protestants point out that the Guidelines recognize that the Rational Method has some limitations—it does not allow for a volume runoff determination or hydrograph development.[146] Therefore, the Guidelines recommend a couple of other methods that may be used to determine volume, but neither of the recommended

[144] Knox Ex.-400 at 9-10.

[145] Knox Ex.-400 at 11.

[146] Knox Ex.-15 at 7.

methods is the Modified Rational Method and neither requires the use of uniform rainfall distribution.[147] Accordingly, Protestants argue, there is nothing in the record demonstrating that the use of the Modified Rational Method to determine volumes for the detention ponds produced reliable and accurate results for a 25-year, 24-hour storm event.

c) OPIC's Position

OPIC agrees with Mr. Dunbar's conclusion that Applicant failed to correctly apply the 25-year, 24-hour storm event when designing the ponds, resulting in undersized and inadequate detention ponds that fail to meet the TCEQ requirements. OPIC questions the use of the Modified Rational Method to design the detention ponds and cites to the fact that Mr. Yadav had not reviewed any original MSW permit application or MSW major amendment applications (numbering 12 and around 100, respectively) that used this method for designing detention ponds.

d) ALJ Analysis on Pond Sizing

To ensure that the proposed landfill development will not adversely alter existing drainage patterns, an applicant must locate, calculate, and design necessary

[147] Tr. Vol. 3 at 134 (Mr. Dunbar explaining the methods recommended by the TCEQ guidance document, none of which require the use of a uniform rainfall event); Tr. Vol. 3 at 74 (Mr. Stiggins acknowledging that the Modified Rational Method is not referenced in the TxDOT manual that TCEQ's guidance document cites as a resource).

collection, drainage, and detention facilities.[148] The 25-year, 24-hour storm event must be used to calculate and design these drainage structures.[149] The permit application must include the hydraulic calculations and designs for the necessary collection, drainage, and/or detention facilities.[150]

Mr. Stiggins testified that he used a 25-year, 24-hour storm event to analyze the surface water and design the detention ponds. Mr. Stiggins's testimony is supported by numerous statements in the Application. The Surface Water Drainage Report provides a table showing the calculations performed for different storm durations to determine the critical storm duration and then the critical volume of storage that would be required for the storms.[151] The Surface Water Drainage Report included volume calculations for the North and South Ponds, respectively, taking into consideration storm durations from 10 to 110 minutes.[152] Mr. Stiggins explained that he included shorter storm durations because they have higher intensities, which happen under the design storms that occurred for 25-year frequency for shorter durations.[153] He also explained that the analysis he performed takes into account the 25-year frequency storm for all durations once the critical volume is determined

[148] Knox Ex-15 at 5 (from Initial Hearing).

[149] Knox Ex-15 at 9 (from Initial Hearing); 30 Tex. Admin. Code §§ 330.63(c)(1)(D)(i), .305(b)- (d)(1).

[150] 30 Tex. Admin. Code §§ 330.63(c)(1), .305.

[151] Tr. Vol. 3 at 51; Application, Part III, Attachment C at Table III.C.F.

[152] Application, Part III, Attachment C at Table III.C.F.

[153] Tr. Vol. 3 at 51.

(including a 24-hour storm).[154] The maximum required storage volume for the North Pond is calculated for a 70-minute storm duration and the South Pond's maximum required storage volume is calculated for a 60-minute storm duration.[155]

Moreover, Mr. Stiggins maintains that the use of a uniform rainfall distribution in the Modified Rational Method calculations is both appropriate and consistent with the Rational Method's assumption of uniform rainfall. Mr. Stiggins proffered that the applicable rules contain no requirement to use a non-uniform rainfall distribution, but they do require use of the Rational Method. Indeed, Dr. Cleveland supports Mr. Stiggins's position, even though he used a non-uniform rainfall distribution in creating his SWMM model.

Protestants argue that the evidence fails to demonstrate that the detention ponds were designed based on the 25-year, 24-hour storm. They also highlight that Dr. Cleveland used a non-uniform rainfall distribution for his modeling, as did Mr. Dunbar. Because Mr. Stiggins used the Modified Rational Method with a uniform rainfall distribution, Protestants contend that his volume calculations relied only on a 60-minute storm for the North Pond and a 50-minute storm for the South Pond, not a 24-hour storm event.

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[154] Tr. Vol. 3 at 52.

[155] Application, Part III, Attachment C at Table III.C.F.

The preponderance of the evidence would suggest that the use of the Modified Rational Method, and its accompanying uniform rainfall distribution, to determine the volume of runoff for a 25-year, 24-hour storm for areas of this size is novel. More specifically, *none* of the testifying experts had used or seen the Modified Rational Method for detention pond design. Both Dr. Cleveland and Mr. Dunbar used other methods with non-uniform rainfall distribution. Nonetheless, the ED approved Applicant's use of this equation for this purpose, as allowed by TCEQ rules, and the preponderance of the evidence demonstrates that the Modified Rational Method was correctly applied and reflected accurately in the Surface Water Drainage Report. Therefore, the ALJ must conclude that Applicant adequately sized the detention ponds, as reflected in the Surface Water Drainage Report submitted with the Application.

IV. CONCLUSION

In conclusion, the ALJ determined that the evidentiary record supports the issuance of the Draft Permit, and therefore, recommends that the Application be granted. The ALJ further recommends that the Commission adopt all Findings of Fact and Conclusions of Law, as submitted in the Initial PFD and as amended in the Supplemental PFD. The ALJ recommends that the Commission not adopt the parties' proposed Findings of Fact and Conclusions of Law that the ALJ did not include, based on the reasoning set out in the Initial PFD and Supplemental PFD.[156]

[156] 30 Tex. Admin. Code § 80.252(e).

V. FINDINGS OF FACT

The following Findings of Fact should be added to the original Proposed Order:

1. On September 13, 2022, the ALJ issued a Proposal for Decision (Initial PFD) recommending that the Application be denied.

2. On December 14, 2022, the Commission considered the ALJ's Initial PFD during an open meeting and voted to remand the matter to SOAH for additional proceedings.

3. The Commission issued an Interim Order on December 22, 2022, remanding the case to SOAH for the ALJ to "take additional evidence, including providing the underlying documents to support the methodologies and calculations used to meet the burden of proof on the surface water drainage issues."

4. The preliminary hearing on remand was held before ALJ Megan Johnson on February 6, 2023, via Zoom videoconference.

5. On February 14, 2023, the ALJ issued an order adopting the parties' agreed procedural schedule on remand for this case.

6. The evidentiary hearing on remand (Remand Hearing) convened on April 3-6, 2023, with ALJ Megan Johnson presiding. The record closed on April 28, 2023, after the parties submitted their final closing arguments and proposed findings of fact and conclusions of law.

Findings of Fact numbers 63, 64, and 65 from the original Proposed Order should be struck and replaced with the following:

63. The Applicant submitted drawings that show the drainage areas and drainage calculations.

64. The Applicant submitted designs of all drainage facilities within the facility area, including all necessary features.

65. The Applicant submitted sample calculations that verify the proposed landfill development will not be adversely alter existing drainage patterns.

66. Existing and proposed conditions were evaluated in the Application for peak flow rates, runoff volumes, and velocities for each comparison point.

67. The Applicant established that the rational hydrologic method was used and provided the underlying calculations used to estimate peak flow rates.

68. The Applicant's surface water drainage report uses runoff coefficients for a 25-year, 24-hour storm event, and the rainfall intensity for the 25-year storm event. The source of these inputs is the Texas Department of Transportation Hydraulic Design Manual.

69. The Applicant submitted all hydraulic calculations and designs used to size the necessary detention facilities.

70. The Draft Permit provides structural designs of the collection and drainage facilities within the facility area, which are appropriately sized.

71. The Applicant assessed the proposed drainage characteristics of the facility and calculated runoff volumes utilizing the Modified Rational Method with appropriate inputs, as specified in the Texas Department of Transportation Bridge Division Hydraulic Design Manual.

72. The ED has approved the use of the Modified Rational Method when assessing the proposed drainage characteristics of the facility.

73. The Permit includes discussion and analyses demonstrating that existing drainage patterns will not be adversely altered as a result of the proposed landfill development.

VI. CONCLUSIONS OF LAW

Conclusions of Law numbers 16 and 22 from the original Proposed Order should be struck and replaced with the following:

1. The Application contains a surface water drainage report that satisfies the requirements of 30 Texas Administrative Code Chapter 330, subchapter G in accordance with 30 Texas Administrative Code section 330.63(c).

2. The Application contains the necessary drawings showing the drainage area and drainage calculations, designs of the drainage facilities, calculations verifying that existing drainage will not be adversely altered and a description of the hydrologic methods and calculations used to estimate peak flow rates and runoff volumes in accordance with 30 Texas Administrative Code section 330.63(c)(1).

3. The Application provides a description of hydrologic method and calculations used to estimate peak flow rates and runoff volumes with the required assumptions in accordance with 30 Texas Administrative Code section 330.63(c)(1)(D)(i)-(iv).

4. The Application contains an assessment of the existing drainage characteristics of the facility according to the rational method, utilizing appropriate surface runoff coefficients, as specified in the Texas Department

of Transportation Bridge Division Hydraulic Design Manual in accordance with 30 Texas Administrative Code section 330.305(f).

5. The Application utilized the Modified Rational Method to calculate the storage volume necessary of detention ponds to collect and control the volume of water resulting from the 24- hour, 25-year storm in accordance with 30 Texas Administrative Code section 330.305(f).

6. Because the Application for Municipal Solid Waste Permit No. 2404 meets all applicable regulatory standards, the requested permit should be issued.

SIGNED June 16, 2023.

ALJ Signature:

Megan Johnson

Presiding Administrative Law Judge