V. TRAFFIC

A. Proposed Findings of Fact Regarding Traffic

483. Michael Oman testified in his capacity as a traffic expert.

484. Mr. Oman is the principal and owner of Oman Analytics. He has thirty years of professional planning and engineering experience, including serving as Director of Economic Development and of Land Use and Environment for the Boston metropolitan planning agency, the MAPC. He holds bachelors degrees in civil engineering and political science from the Massachusetts Institute of Technology (MIT) and a masters in Urban and Environmental Policy from Tufts University. (N-15)

485. Mr. Oman has knowledge of applicable Act 250 criteria and has been admitted as an expert witness before Vermont Environmental Court, Vermont Environmental Board, and numerous

District Environmental Commissions in a variety of cases. Mr. Oman testified before the district Commission in this matter (N-15)

486. Mr. Oman has knowledge of applicable Moretown Zoning Regulations and testified before the Moretown DRB in this matter.

487. Traffic associated with the proposed quarry will result in a hazard to public health and safety, create dangerous and noxious or injurious conditions that adversely affect the reasonable use of adjoining or nearby properties, and have an undue adverse effect on neighboring properties and uses. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 14-15)

488. The Rivers' proposed quarry will create dangerous and noxious or injurious conditions that adversely affect the reasonable use of adjoining or nearby properties. For purposes of Mr. Oman's analysis, an "adverse effect" has been taken to mean any measurable increase in recognized negative quality, e.g. measurable increase in traffic/congestion. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 14-15)

489. Rivers' proposed quarry will have an undue adverse effect on neighboring properties and uses. An "undue adverse effect" has been taken to mean an increase in a recognized negative quality that rises above a recognized threshold or standard, e.g., traffic/congestion dropping to los D or worse, or inadequate sight distance. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 14-15)

490. Rivers' proposed quarry will have substantial impacts on abutters and users of the public roads and access routes in the vicinity of the proposed quarry entrance because of the dramatically increased truck traffic. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 14-15)

491. Rivers' proposed quarry will have an adverse effect on the character of the area because of the number and frequency of truck trips. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 14-15)

492. Rivers' proposed quarry as designed provides for inadequate intersection sight distances (ISD) for the vehicles, speeds and conditions at the proposed entrance. Failure to provide for adequate ISD is in violation of zoning requirements for safe and efficient conditions on public roadways. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 13-15 and Appendix D)

493. The lower sight distance (895') that is proposed in the VTrans letter of intent for the curb cut is based on "splitting the difference" between the required sight distances for combination trucks (required sight distance: 980') and single unit trucks (required sight distance: 810'). What such an approach is saying is that conditions at the proposed quarry entrance will only be unsafe some of the time (i.e., whenever a larger, articulated combination-type truck is exiting the quarry). This is not acceptable traffic safety engineering practice. The established ISD standards are required minimums and they operate as thresholds, i.e., to satisfy the ISD standard, minimum available sight distance must meet or exceed the threshold. There is no provision for "splitting the difference" between minimum thresholds for any reason. (N-1/T-1, page 13 and e-mail documents in Appendix D)

494. Rivers' proposed quarry will result in unsafe and impeding conditions for bicyclists and other nonvehicular uses (e.g., walkers, joggers) on this important bicycle and designated scenic route, due to slow moving trucks entering and exiting the proposed quarry and spilled stone, dust and dirt around the proposed quarry access. (Testimony of Oman

2/22/08 & N-1/T-1 Pages 13-15)

495. VTrans data indicates that there are likely only somewhere in the vicinity of half a dozen to a dozen total trips even possible to be intercepted, assuming it is possible to intercept 100% of them. This overall conclusion is confirmed by a citizens' survey of trucks on Route 100B on August 17, 2004. On that date, a number of citizens conducted a day long survey of all dump style vehicles on Route 100B in the vicinity of the Rivers' proposed quarry including, insofar as could be determined, the nature of their contents. To assure coverage of all the main aggregate hauling hours, the survey was conducted from 6:00 A.M. to 6:00 P.M. The results of this survey are contained in Table 1 of Oman's report, admitted as N.1/T.1. Perhaps most notable among the results of this survey is that not a single loaded truck could be identified as hauling crushed stone. If one assumes that all (100%) of the trucks whose contents could not be identified are hauling stone, that would result in no more than thirteen (13) truck trips per day even remotely eligible for "interception." This is an upper limit. Since it is unlikely that all of the unknown loads were stone (especially since none of the identifiable loads were), the actual figure is likely to be much less than this. If, for example, only half the loads were crushed stone, this would result in a total of only about six (6) trips per day even compatible for substitution. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 5-6)

496. Roger Dickinson testified that all truck traffic accessing the proposed quarry will be 100% new traffic as there are no trucks entering or exiting that site today. Therefore, the negative impacts to the neighbors, the traveling public and recreational users of 100B such as noise, diesel exhaust, and safety risks will also be new. (Cross Examination of Roger Dickinson)

497. A key factor in assessing the impact on abutters, traffic and recreationists (bikers, walkers, fishermen, etc.) is the duration that trucks will be accessing the site. While there is no universally accepted methodology for assessing this, and certainly there will be variation, it is possible to get a general idea of the order of magnitude. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 6-8)

498. One of the factors affecting the impact of trucks accessing the proposed quarry is the acceleration/deceleration rates of the trucks accessing the site. This may be expected to vary fairly widely; however, a detailed study of acceleration indicates that a reasonable average acceleration rate for a loaded dump truck would be just under 1 mph/second. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 6-8, not disputed by the applicant)

499. Using this rate of 1 mph/second results in a requirement of 50 seconds to accelerate from a full stop at the entrance to the 50 mph posted limit. For purposes of this analysis, the deceleration rate has been taken to be about equal to the acceleration rate. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 6-8, not disputed by the applicant)

500. For negotiating the steep 1400-foot access drive, a speed of 10 mph (or about 15 fps) has been assumed. This will result in a one-way trip duration of about 95 seconds (190 seconds round trip) to negotiate the haul road. Adding in deceleration and acceleration time on Route 100B required to complete the access to the site results in a total one way trip duration of 145 seconds (50 seconds acceleration/deceleration + 95 seconds haul road), and a total round trip duration of 290 seconds, or 4:50 minutes. This does not include time required on-site to complete the loading itself nor any prep, queuing if busy, etc. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 6-8, not disputed by the applicant)

501. The Applicant has estimated the scale-to-scale loading time to be about 5:00 minutes on average. Based on the Applicant's own trip generation numbers, including peaking factors (1.5 x peak day, and 2.0 x peak hour), an average 2:25 minute one-way access trip, and a 5:00 minute allowance for actual loading, heavy truck traffic may reasonably be expected to be accessing the quarry hourly in accordance with Table 2 of N.1/T.1. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 6-8, not disputed by the applicant)

502. Heavy trucks will be accessing the quarry well over one-half (½) of the time all day long most days the quarry is in operation (average day), and nearly continuously (54 minutes per hour) all day on a peak day. During peak hours of each (average) day (i.e., daily, when the quarry is in operation), heavy trucks will be accessing the site continuously, and during peak hour(s) of peak day(s), there will be nearly two (2) heavy trucks on site at all times. Obviously, if the higher trip making associated with legal weight limits obtains, these impacts will be correspondingly, and significantly, higher. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 6-8 and Table 2a, not disputed by the applicant).

503. The applicant underestimated the number of trucks required to haul the proposed 75K cubic yards by not accounting for the weight of the stone and the Vermont State truck weight limitations. This will results in a higher average number of trucks per day and likely more peak days. N.1, pages 2–3.

504. The impact of these trips on neighbors and those who use Route 100B and its environs will be significantly more severe than that of a truck passing at a steady 50 mph (as well as being much longer than the 25 seconds it would take the 50 mph truck to traverse the 1800' required for acceleration/deceleration distance). (Testimony of Oman 2/22/08 & N-1/T-1 Pages 6-8, not disputed by the applicant)

505. Instead of 50 seconds required for each round trip from another source on Route 100B, each truck brought by Rivers' quarry will spend almost ten (10) minutes accessing the site. During this time, the trucks will be accelerating, decelerating, climbing or descending the haul road. It is during these operations that trucks produce the maximum of noise and air pollution, including fine particulates due to higher revving engines, higher power output and fuel consumption, and "Jake braking" on the descent and deceleration. By contrast, a truck at steady highway speed, while far from free of impacts, has far less impact on its surroundings, including properties and neighbors. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 6-8, not disputed by the applicant)

506. The Moretown Zoning Regulations state at Section 3.5(C)(1) that the proposed activity must not cause a hazard to public health or safety, or otherwise have an undue adverse effect on: (1) neighboring properties and uses.

507. The Moretown Zoning Regulations state at Section 4.10(A) that no land or structure in any zoning district shall be used or occupied in any manner so as to create dangerous, injurious or noxious conditions that adversely affect the reasonable use of adjoining or nearby properties.

508. The quarry will use land in a manner that creates dangerous [ISD, heavy truck traffic], injurious or noxious [noise, dust, diesel exhaust] conditions that adversely affect the reasonable use [quiet enjoyment due to noise, dust, diesel exhaust, visual] of adjoining or nearby properties. (Testimony of Oman 2/22/08 & N-1/T-1 Pages 14-15)

B. Proposed Conclusions of Law Regarding Traffic

Neighbors' Question #7 of their Clarified Statement of Questions in Docket No. 68-3-07 Vtec asks: "Does the proposed quarry fail to comply with 10 V.S.A. § 6086(a)(5) because it will cause unreasonable congestion and/or unsafe conditions with respect to traffic due to increased traffic, including heavy truck traffic, and unsafe conditions on Route 100B and at the intersection of the quarry haul road with Route 100B, and Rivers' failure to properly identify and evaluate such truck traffic?" We must conclude that the proposed quarry will cause unsafe conditions with respect to traffic because the 895′ proposed sight distance in a northerly direction along Route 100B for trucks exiting the quarry is inadequate.

The anticipated new truck traffic as represented by the Applicant would consist of primarily small (7 cubic yard, 2 axle) dump trucks and large (15–16 cubic yard tandem/tri-axle) dump trucks, along with some very large (combination/pup trailer) dump trucks. Rivers will have no control over what types of trucks its customers choose to bring to the quarry, so the above representation is only an approximation. The American Association of State Highway and Transportation Officials ("AASHTO") sets the standards for adequate intersection sight distance that are used in Vermont, and nationally. In a speed study, VTrans found the actual speed on Route 100B in the vicinity of the project to be 58 mph and also found that speed to be the appropriate design speed for intersection sight distance at this location. Based on this design speed, the required intersection sight distance for large combination trucks is 980′, not 895′.

The lower sight distance (895') that is proposed in the VTrans letter of intent for the curb cut is based on "splitting the difference" between the required sight distances for combination trucks (required sight distance: 980') and single unit trucks (required sight distance: 810'). What such an approach is saying is that conditions at the proposed quarry entrance will only be unsafe some of the time (i.e. whenever a larger, articulated truck is exiting the quarry). This is not acceptable traffic safety engineering practice. The intersection sight distance must be adequate to ensure safe conditions all the time, even when large, loaded combination trucks are exiting the quarry and getting up to speed. The established intersection sight distance standards are required minimums and they operate as thresholds, i.e., to satisfy the intersection sight distance standard, minimum available sight distance must meet or exceed the threshold. There is no provision for "splitting the difference" between minimum thresholds for any reason. (N-1/T-1, page 13 and e-mail documents in Appendix D).

In addition, the proposed quarry, if permitted, would result on an average day in somewhere between 36 loads/72 trip ends (as estimated by Rivers) and 47 loads/94 trip ends (as estimated by the Neighbors and the Town) accessing the quarry. Each of these 36–47 loaded trucks will be pulling out from the access road onto Route 100B at a point where Route 100B curves around the crest of a hill. During one of the site visits, the Court observed several vehicles traveling southerly on Route 100B at a high rate of speed around this curve. The addition of slow-moving heavily loaded trucks entering Route 100B from a full stop at this location would pose a serious risk of traffic accidents. For these reasons, we must conclude that the proposed quarry would cause unsafe conditions with respect to Route 100B, in violation of Criterion 5.

Neighbors' Questions #5–7 of their Statement of Questions in Docket No. 7-1-05 Vtec ask, in general, whether the proposed quarry complies with the requirements of MZR § 3.5 governing the extraction of earth resources. MZR § 3.5(A) requires that earth extraction projects meet the conditional use criteria of MZR § 5.2. MZR§ 3.5(C) requires that the proposed activity not cause a hazard to public health or safety, or otherwise have an undue adverse impact on, inter alia, neighboring properties and uses (§ 3.5(1)). We have already concluded under Criterion 5 that the entry of heavily loaded trucks with inadequate sight distances at the proposed intersection of the quarry access road and Route 100B will cause a public safety hazard.

Our conclusion as to whether, under MZR § 3.5(C), the quarry traffic would have an undue adverse effect on neighboring properties and uses turns on whether the quarry truck (including customer truck) impacts will be new impacts, or will merely intercept existing heavy truck traffic. Thankfully, there is guidance on this complex question from the Institute for Transportation Engineers. Standard trip generation methodology is established by the Institute for Transportation Engineers (ITE) in its "Trip Generation Handbook: An ITE Recommended Practice," (March 2001) and the associated data contained in "Trip Generation." Although standard methodology incorporates the notion of "pass-by trips" for large commercial uses in which a new or expanded use essentially intercepts existing traffic on the route serving the use, it makes no provision for the very different concept of a new trip with a new origin replacing an existing trip on the same route. ITE does not provide data on potential "substitution" of trips from a quarry. As standard practice, all trips from a new quarry are considered new trips. Based on this, any meaningful reduction of existing truck traffic on 100B due to the proposed project is highly unlikely. This finding is consistent with standard trip generation methodology and is appropriate in this case.

The new traffic from Rivers' proposed quarry will have substantial impacts to abutters and to users of the public roads and access routes in the vicinity of the proposed quarry entrance because of the dramatically increased truck traffic. Moreover, all truck traffic accessing the proposed quarry will be 100% new traffic as there are no trucks entering or exiting that site today. Therefore, the adverse effects to the neighbors, the traveling public and recreational users of 100B will also be new. These adverse effects include noise, diesel exhaust, and safety risks. The proposed quarry will cause unsafe and impeding conditions for bicyclists and other nonvehicular uses (e.g., walkers, joggers) on this important bicycle and designated scenic route, due to slow moving trucks entering and exiting the proposed quarry and spilled stone, dust and dirt around the proposed quarry access.

Based on the Applicant's own trip generation numbers, including peaking factors (1.5 x peak day, and 2.0 x peak hour), an average 2:25 minute one-way access trip, and a 5:00 minute allowance for actual loading, heavy truck traffic may reasonably be expected to be accessing the quarry hourly in accordance with Table 2 of Exhibit N.1/T.1. According to Table 2 of Exhibit N.1/T.1, heavy trucks will be accessing the quarry well over half of the time all day long most days the quarry is in operation (average day) and nearly continuously (54 min per hour) all day on a peak day. During peak hours of each (average) day (i.e. daily, when the quarry is in operation), heavy trucks will be accessing the site continuously, and during peak hour(s) of peak day(s), there will be nearly 2 heavy trucks on site at all times.

The impacts of these trucks on neighbors and users of Route 100B and its environs will be significantly more severe than those of a truck passing at a steady 50 mph. Instead of 50 seconds required for each round trip from another source on Route 100B, each truck brought by Rivers' quarry will spend almost ten (10) minutes accessing the site. During this time, the trucks will be accelerating, decelerating, climbing or descending the haul road. It is during these operations that trucks produce the maximum of noise and air pollution, including fine particulates due to higher revving engines, higher power output and fuel consumption, and "Jake braking" on the descent and deceleration. By contrast, a truck at steady highway speed, while far from free of impacts, has far less impact on its surroundings, including properties and neighbors.

We must conclude that the impacts from quarry truck traffic would be new impacts that create safety hazards and unduly adversely affect neighboring properties and uses, in violation of MZR § 3.5(C).

Neighbors' Question #12 of their Statement of Questions in Docket No. 7-1-05 Vtec asks: "Whether, under MZR Section 4.10(A), the land or structure(s) for the application and proposed quarry will be used or occupied in any manner so as to create dangerous, injurious or noxious conditions that adversely affect the reasonable use of adjoining or nearby properties?" As discussed above in the context of Criterion 5 and MZR § 3.5(C), we conclude that the quarry truck traffic would create a dangerous condition and adversely affect the reasonable use of nearby properties.

Neighbors' Question #14 of their Statement of Questions in Docket No. 7-1-05 Vtec asks, in part: "Whether, under MZR Section 5.2(C), the application and proposed quarry will not adversely affect the following: [...] (2) **The character of the area affected.** The [Court] shall consider the location, scale, type, density and intensity of use associated with the proposed development in relation to the character of the area likely to be affected, as defined by the [Court] based on the Moretown Town Plan, applicable zoning district purposes and standards, submitted materials, and testimony presented at public hearing. (3) **Traffic on roads and highways in the vicinity.** The [Court] shall consider the potential impact of projected traffic resulting from the proposed development in relation to the condition, capacity, safety, and function of roads and associated infrastructure (e.g., bridges, culverts) potentially affected by the proposed development." As discussed above in the context of Criterion 5 and MZR § 3.5(C), we conclude under MZR § 5.2(C)(3) that the quarry would adversely affect traffic on Route 100B by creating a dangerous condition at the intersection of the proposed access road and Route 100B. Under MZR § 5.2(C)(2), we must conclude that the heavy truck traffic associated with the proposed quarry would substantially and materially adversely affect the character of the area by adding 36 to 47 heavily loaded dump trucks per day, on average, to an area characterized by peaceful residential and equestrian uses. Each of these new trucks will be slowing down on Route 100B to access the site, grinding up the quarter-mile steep access road, grinding back down the access road after being loaded, and then pulling out and accelerating onto Route 100B, belching black diesel exhaust all the while. Adjoining neighbors and the nearby horse farms will clearly be adversely affected by this new industrial activity, in violation of MZR § 5.2(C)(2).