

Public Hearings - Queen Anne's County - Approval of Golf Course 1950 MSA - S1830-84

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REPORTED BY: DEBORAH TURNER, NOTARY PUBLIC

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P R O C E E D I N G S

1
2 CHAIRMAN CORKRAN: Good afternoon. My name is
3 Bill Corkran, who is chairing this panel for the
4 Critical Areas, and Kay Langner is to my left. She is a
5 member, and John Griffin, who is a member of the
6 Critical Areas Commission.

7 Tom Deming is our attorney, who is sitting to
8 my right here.

9 There are two or three things we would like to
10 clear up. Number one, we would like to -- when Ren
11 Serey returns the status of his testimony the last time,
12 and we ended at some 12:40, or whatever it was, in the
13 morning.

14 One thing that we do need to ask is, does
15 anyone have any statement -- this morning, for the rest
16 who were not there, or may not have known it, we took a
17 tour of a golf course at Hog Neck in Talbot County, and
18 then went from there to the site that is -- where the
19 proposed golf course is to be constructed.

20 Does anyone have any statement they would like
21 to make for the record --



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1 MR. DEMING: Any of the parties.

2 CHAIRMAN CORKRAN: Any of the parties covering
3 those two site visits, the one at Hog Neck and the one
4 at the site?

5 MR. MURPHY: Nothing from me, Mr. Corkran.

6 MR. MURRAY: Nothing.

7 CHAIRMAN CORKRAN: All right, fine, thank you.

8 Now the other one that we wanted was -- oh,
9 yes, our counsel suggests that because we are making a
10 written transcript of the hearing that, as we had it the
11 last time, and I think I noted once or twice, that we
12 had the same material being repeated at least three
13 times, and I would hope that we don't do that today.
14 Otherwise we may be back in the wee hours of the morning
15 again.

16 So we would implore you to keep as brief as
17 possible, but we still want to have a full presentation
18 from your side to begin with, and then your cross-
19 examination.

20 And we would thank you very much if you could
21 do that.



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1 MR. DEMING: Ren Serey is down copying a
2 couple of letters that have been sent, and will be
3 offered to counsel before they're offered for the
4 record. But as the Chairman mentioned, we closed the
5 hearing on April 23rd with Ren Serey submitting his
6 comments in writing. I don't think they were formally
7 entered into the record, and at this time -- I guess the
8 question would be, you both had copies of it at the end
9 of that hearing, were there any objections to this
10 simply being entered in as a written statement, so that
11 we can move on to Mr. Murphy's case?

12 MR. MURPHY: No objection.

13 MR. MURRAY: I have no objection to this entry
14 as a written statement, but I would like an opportunity
15 to examine Mr. Serey briefly. I think there's some
16 things in there that I would like to clarify, and I know
17 of no other way to do it than to ask him questions and
18 have him respond.

19 MR. DEMING: Okay. Well, why don't we --
20 since he's still off making some copies, why don't we go
21 ahead with Mr. Murphy's case, if you have no



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1 objection, and then we'll take Ren at the end.

2 CHAIRMAN CORKRAN: Any problem with that?

3 MR. MURRAY: No objection.

4 MR. DEMING: So would you proceed, please?

5 MR. MURPHY: Thank you.

6 Thank you, Mr. Chairman and Mrs. Langner and
7 Mr. Griffin.

8 I want to take just a minute to give you a
9 preview of what our case is. It really falls into three
10 categories.

11 The first category is the relationship of the
12 golf course to the critical area criteria expressed in
13 the adopted regulations. I have several witnesses who
14 are going to speak on the nature of golf courses, and
15 the degree of grading, construction involved in this
16 golf course.

17 And I'm also going to introduce some materials
18 with respect to that issue.

19 The second issue is really much more
20 complicated, and in a way I don't pretend to be able to
21 completely understand it, frankly. It deals with the



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1 environmental effect of the golf course. I think that
2 the proponents of the golf course have attempted to
3 assert that there really is no substantial environmental
4 -- adverse environmental effect associated with this
5 golf course. And I think also that there is a common
6 perception that golf courses are basically a benign,
7 non-threatening use. And what I wish to demonstrate --
8 what I'll seek to demonstrate this afternoon, and I
9 would say I would like it always to be understood that
10 this is very much oriented to this particular site.
11 That there are very serious environmental problems that
12 exist with this golf course.

13 I don't think I can explain it any easier than
14 to say that as I understand what the proponents said,
15 they make a claim that the run off from the golf course
16 has basically been handled, through two ways. Through
17 the reconfiguration of the site to direct the run off
18 inward to the six new ponds being constructed; and also
19 through the establishment of turf in place of tilled
20 soil, particularly on the farm land, and that there will
21 be less run off associated with that.



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1 And as I understand their case, they made then
2 the claim that since the run off was basically being
3 handled, the effect on the aquatic resources was nominal
4 or marginal or very small. And I think we have here a
5 real factual issue, and my witnesses -- and this is not
6 me, but it's my witnesses who know the subject far
7 better than I do, will explain to you that the
8 nutrients, particularly from the fertilizer, and the
9 substances from the pesticides, are not really carried
10 in this case by run off, but what happens is that the
11 leech down through the soil column and go to the ground
12 water. And that's very much site specific in this case,
13 because we have very sandy soils, and the ground water
14 is within two feet of the surface.

15 And then we have the whole question then of
16 the ground water and its relationship to Queenstown
17 Creek and to the Chester River.

18 We are also going to talk about the
19 relationship of this course in this location to wild
20 life.

21 Then the final part of my presentation will



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1 deal with, I guess, the question is where do we go from
2 here, and I'm going to suggest that we can't really do
3 these types of decisions like this on a case by case
4 basis. I mean, just to use another tangible example, I
5 don't know which direction the ground water flows. From
6 this site it could flow into Queenstown Creek, it could
7 flow out into the Chester River, it could flow in an
8 entirely different direction. We don't really know
9 this. Just as an example, and that's very important for
10 knowing when these nutrients come and hit the ground
11 water where they go, where they end up, and what effect
12 they have.

13 And when I say where do we go from here, what
14 we're going to suggest is that there's no way of really
15 knowing the environmental impact of this golf course
16 with the evidence that I have, or any that I've heard
17 from Mr. Murray's side.

18 For example, in Baltimore County, which has a
19 number of golf courses approved, they study the streams
20 for a year beforehand to determine the base line quality
21 of those streams before they approve a golf course. And



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1 I'm suggesting -- I'm not suggesting a year, but I'm
2 suggesting that's how something like this has to go
3 about.

4 Mr. Serey, and I have the highest respect for
5 the Commission and its staff, in his staff report, which
6 I believe Mr. Serey and Dr. Taylor prepared, they say
7 that one of the issues to be addressed is an analysis of
8 potential impacts to surface and ground water quality.
9 And what I'm suggesting is, is that our knowledge on
10 this subject is such that we have to accumulate the
11 knowledge on this golf course before we make a decision
12 as to whether it will have an adverse environmental
13 effect or not.

14 And secondly, where we go from here is also
15 related to what are we talking about. Before we look at
16 a golf course we have to know whether it is going to be
17 restricted to a golf course or not. I mean we really
18 don't know now whether we're talking about the
19 environmental effect of a golf course, or are we talking
20 about the environmental effect of houses with a golf
21 course. Mr. Stevens, the County planning director,



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1 testified the other evening that houses could be
2 constructed with a golf course.

3 This property, and these owners, have a long
4 history of wanting to place an inn on the property, a
5 hotel, with a waterfront facility that would attract
6 boats, and we don't know really whether that's what
7 we're talking about. Because we deal in the United
8 States of America where people have property rights, and
9 if there's not a law restricting those property rights,
10 they can exercise it. And whatever the intention of
11 these parties is, properties can be sold, and properties
12 utilized to their highest extent.

13 So those are my three points, my preview of
14 what our case is going to be about, and with those
15 remarks I'd like to call our first witness, Mr.
16 Campanella.

17 He's sitting right here. Would this be
18 comfortable?

19 I think we need the microphone.

20 CHAIRMAN CORKRAN: And for those witnesses, if
21 I may interrupt for just a moment, if you would state



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1 your name so that our reporter can get it spelled
2 properly and so forth.

3 MR. CAMPANELLA: My name is Joseph, middle
4 initial "A", Campanella, C-A-M-P-A-N-E-L-L-A.

5 MR. DEMING: Mr. Murphy, I believe our
6 practice at the last hearing, at Mr. Murray's request,
7 was to have the witnesses sworn.

8 Do you waive the swearing of the witnesses?

9 MR. MURPHY: All right, would you stand and
10 take the oath, Mr. Campanella?

11 MR. DEMING: He's waived it.

12 MR. MURPHY: Well, no, he ought to take it if
13 Mr. Murray wanted it.

14 Do you want it, Mr. Murray?

15 MR. MURRAY: Not as to this witness, no.

16 MR. MURPHY: I think we ought to -- I'd rather
17 not have to pick or choose the witnesses he wants sworn.
18 I'd like all my witnesses to be sworn.

19 Whereupon,

20 JOSEPH A. CAMPANELLA,

21 a witness, called for examination by counsel for the



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1 Citizens for Preservation of Queenstown Creek, was duly
2 sworn, and was examined and testified as follows:

3 DIRECT EXAMINATION BY COUNSEL FOR THE CITIZENS

4 BY MR. MURPHY:

5 Q Mr. Campanella, what is your occupation?

6 A I'm a real estate consultant, appraiser.

7 Q And how long have you been engaged in that
8 occupation?

9 A About eight years.

10 Q Do you have your own real estate appraising
11 firm?

12 A I do. I'm the head of a mid-size appraisal
13 consulting firm with eleven professionals.

14 Q And you appraise properties throughout the
15 State of Maryland?

16 A Yes.

17 Q And have you achieved the designation of MAI?

18 A Yes, I do hold an MAI designation.

19 Q Did I ask you to look into how golf courses
20 are built today, from a commercial standpoint -- I mean
21 a financial standpoint?



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1 A Yes, you did.

2 Q And would you, without me asking specific
3 questions, would you just tell the Commission basically
4 what you found out about how golf courses are built
5 today, what the economics of them are, et cetera?

6 MR. MURRAY: Objection. This witness has been
7 qualified at best as a real estate appraiser. There's
8 been no foundation laid whatsoever that he has any
9 knowledge or experience whatsoever with development of
10 golf courses.

11 CHAIRMAN CORKRAN: Would you like to establish
12 his qualifications at greater extent?

13 BY MR. MURPHY:

14 Q Mr. Campanella, did you do some research and
15 investigation into golf courses?

16 A Yes, I have.

17 Q Would you describe that for the Commission?

18 A Yes, what I've done essentially is to spend
19 about a week and a half studying the golf course
20 economics. I have read a study prepared for Howard
21 County on the development -- a feasibility study on the



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1 development of a municipal golf course for Howard
2 County, which was prepared in 1988 by a company called
3 Golf Resource Associates.

4 I've also taken time to review the Urban Land
5 Institute's Developing with Recreational Amenities.
6 There's an entire section on golf courses.

7 In addition to that, Mr. Murphy asked me to
8 look into the economics, general economics of golf
9 courses. I took the time to call some of the people who
10 are in the golfing industry. I touched base with the
11 people who were involved with the study for Howard
12 County --

13 Q That is the consultants who prepared this
14 report?

15 A Yes.

16 And I also spoke to the gentleman who is the
17 operator of five municipal courses for Baltimore City,
18 Mr. Lenny Cook. And I have to say that, one, I'm not an
19 expert in golf courses per se. I do have a lot of
20 experience in the land use economics, and I regard
21 myself as a student of that.



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1 What I found essentially was --

2 MR. MURPHY: I would offer Mr. Campanella as
3 an expert real estate appraiser.

4 CHAIRMAN CORKRAN: Do you have any --

5 MR. MURRAY: I have no problems with Mr.
6 Campanella as a real estate appraiser. What real estate
7 appraisal has to do with this matter escapes me.

8 MR. MURPHY: Well, we'll get into that in the
9 questions.

10 MR. MURRAY: There's no foundation laid, as
11 far as I have heard, that has anything to do other than
12 the fact that he's made a telephone call and spent a
13 week thinking about golf course economics, whatever that
14 means, without any consideration, apparently, with
15 bringing it into connection with this particular golf
16 course, which presumably is what we're here about, not
17 golf courses generally.

18 This man has no experience with golf courses
19 whatsoever, other than having given it some thought in
20 the last week, and certainly has no foundation to give
21 anything with respect to this particular golf course.



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1 I do object to any further testimony on his
2 part about this golf course or its economics.

3 CHAIRMAN CORKRAN: Mr. Murray, what we'll do
4 is to note your objection to this, but let him proceed.

5 BY MR. MURPHY:

6 Q All right, Mr. Campanella, would you proceed.

7 A What I did initially was talk to the people
8 who have significant experience consulting on golf
9 course development and feasibility, about the notion of
10 highest and best use. That is when people build golf
11 courses how do they get the most profit out of them.
12 And what I found in the vast majority of the cases was
13 that golf courses today are combined with other
14 commercial activities, like home building, inns,
15 restaurants and the like, simply because the economics
16 of building the course have become so expensive that
17 it's, in most instances, not feasible for a developer to
18 come in and build a course without re-capturing some of
19 his investment in the way of building home sites, or
20 other commercial amenities.

21 That was one of the first things that I looked



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1 at. And in a review of the Howard County study what was
2 interesting was that the municipal study for Howard
3 County proposed a development budget of a little under
4 five million dollars for an 18 hole course. That was
5 exclusive of the land cost. If we add in land costs in
6 Howard County of -- let's say two million dollars for an
7 18 hole course, and these are very general numbers,
8 they're not to be taken as specific numbers, but so that
9 you can get an idea of sort of the magnitudes. This
10 seven million dollar investment would generate after the
11 tenth year an income stream of only a little less than
12 \$400,000. So we're seeing sort of a five percent or
13 less return on investment. It's not very exciting to
14 the typical developer at that level.

15 I spoke briefly with the gentleman who -- one
16 of the gentleman who is involved with the Hog Neck golf
17 course, which I understand you visited this morning, and
18 his -- I reviewed in a general way the revenues and
19 expenses that they're able to achieve there at a public
20 course. And he indicated that their intention is to
21 keep fees down, and produce an income stream based on



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1 making it affordable for people to be able to golf
2 there, and as result they grossed about \$700,000, they
3 had expenses of about \$600,000, so they netted about
4 \$100,000. And they indicated that that was what they
5 intended to do every year, trying to keep sort of
6 \$100,000 of reserve. And I asked him how much would --
7 you know, how much the course cost to develop and so
8 on, and he mentioned it was developed in two stages, the
9 first stage was back in 1975, and it cost them 2.3
10 million dollars in 1975 to build the first 18 holes.

11 I think the second phase, the nine hole phase
12 was built several years later and he wasn't sure exactly
13 what that cost.

14 But he estimated five million dollars to
15 produce the course today, exclusive of land costs.

16 And so just by way of general numbers you can
17 see that without even the land cost you're making a
18 hundred thousand dollars, and you're investing over five
19 million.

20 Those were a couple of the things that I was
21 able to find. In Baltimore County it's interesting to



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1 note that they're building a -- trying to build a
2 private golf course out there. This is a top of the
3 line private course. There's a Sunpapers article here
4 that quotes one of the developers, a Mr. Disharoon,
5 where he says that they need to produce 32 home sites to
6 make this course work, and he says the homes will cost
7 at least \$500,000 each, and the sixteen million dollars
8 they'll bring is the key in the success or failure of
9 the plan, according to the testimony of Mr. Disharoon.

10 I think that sort of sentiment, the need to
11 have additional commercial uses for the golf courses,
12 was pretty much what I found across the board. The
13 gentleman who was running the municipal courses for
14 Baltimore City on a contract basis, Mr. Cook, indicated
15 that it's very, very difficult to make money if you have
16 to pay for the land. In fact he noted -- wouldn't
17 disclose the numbers to me, that the rent that they're
18 paying for the land from the Baltimore City courses was
19 significantly below market, which again goes to show you
20 that revenues generated only by daily rounds, golf cart
21 rentals, and small ancillary services are typically



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1 insufficient to pay for the enormous investment of a
2 golf course.

3 So in general terms that's what I found. I
4 hope that's responsive.

5 Q How is the -- well, if the rounds are
6 insufficient to pay for the investment in the golf
7 course, how is that investment repaid when golf courses
8 are built today?

9 A Well typically today what happens is there are
10 significant blocks of land withheld, or developed
11 concurrently. Many times before the golf course is
12 developed the home sites are laid out, and people need
13 to -- the developers essentially need to have that
14 revenue up front to generate a project that's feasible.

15 Q Now would a course that's built by a local
16 government, or a state government, would it have the
17 same financial constraints as a private course?

18 A Well, no. Of course the governments operate
19 under a different set of rules, profitability for them
20 is not -- doesn't have a bottom line, and what we found
21 is that they typically will either get the land through



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1 a gift, or a very low cost, and they will -- they're
2 willing to operate on a very low profit margin, if they
3 are in fact making a profit.

4 Q So they don't have the same -- you didn't see
5 with the government courses the home sites or hotels and
6 restaurants, and that sort of thing?

7 A I haven't seen it. That doesn't mean that it
8 exists. My experience in this field is not nationwide.

9 MR. MURPHY: That's all I have.

10 CHAIRMAN CORKRAN: Mr. Murray?

11 CROSS-EXAMINATION BY COUNSEL FOR THE APPLICANTS

12 Q Mr. Campanella, exactly how many golf courses
13 have you studied?

14 A I have informally studied -- I have never
15 formally made a feasibility study of a golf course.
16 I have informally studied the economics of golf in the
17 last week or so, at the request of Mr. Murphy,
18 primarily through communications with people who are in
19 the business, and reviews of literature available, that
20 I've described.

21 Q You don't know anything about the economics of



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1 this particular golf course, do you?

2 A No, I don't. I'd be happy to study it.

3 MR. MURRAY: No other questions.

4 CHAIRMAN CORKRAN: Thank you.

5 MR. MURPHY: Any objection to Mr. Campanella
6 leaving?

7 MR. MURRAY: No.

8 MR. MURPHY: Mr. Kutcher.

9 DIRECT EXAMINATION BY COUNSEL FOR THE CITIZENS

10 BY MR. MURPHY:

11 Q Would you please state your name?

12 A Arthur S. Kutcher, that's K-U-T-C-H-E-R.

13 Q What is your occupation, Mr. Kutcher?

14 CHAIRMAN CORKRAN: Wait a minute. You want
15 him sworn?

16 MR. MURPHY: Yes. Stand up and be sworn,
17 please.

18 Whereupon,

19 ARTHUR S. KUTCHER,

20 a witness, called for examination by counsel for the

21 Citizens for the Preservation of Queenstown Creek, was



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1 duly sworn, and was examined and testified as follows:

2 BY MR. MURPHY:

3 Q What is your occupation, Mr. Kutcher?

4 A I'm an urban planning consultant.

5 Q Would you tell the members of the Commission
6 what your education has been, briefly?

7 A Briefly. I'm a graduate of Yale University,
8 Bachelor of Arts, architecture honors major. I have a
9 Bachelor of Architecture degree from the University of
10 California, Berkeley, and I am a research fellow at the
11 Towson State University Institute of Suburban and
12 Regional Studies.

13 Q And have you practiced architecture and
14 planning for how long?

15 A About 20 years.

16 Q You've practiced abroad, as I understand
17 it, and in the United States?

18 A That's right.

19 Q Have you been employed by any local
20 governments in Maryland?

21 A Yes, I was employed by Baltimore County. I



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1 was the head of the design section of the Baltimore
2 County Office of Planning and Zoning. I was a planning
3 consultant to Howard County, working on the formulation
4 of the new Howard County general plan, in land planning
5 and rural area planning.

6 Q Have you, in fact, published several books on
7 planning and architecture?

8 A I've published two books, one is called The
9 New Jerusalem, which was published in London, and in New
10 York by Tenson Hudson, and again in the second edition
11 by the Massachusetts Institute of Technology press in
12 Cambridge, Massachusetts.

13 And the second book called Looking at London,
14 about the urban planning of London, published in London
15 and New York.

16 Q And in the United States have you qualified as
17 an expert witness before any governmental bodies?

18 A Yes, I have.

19 Q Which are they?

20 A Before the Worcester County county
21 commissioners, before the Baltimore County zoning



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1 commissioner, before the Baltimore County Board of
2 Appeals.

3 MR. MURPHY: I offer Mr. Kutcher as an expert
4 planner.

5 MR. MURRAY: No objection.

6 BY MR. MURPHY:

7 Q Mr. Kutcher, have I asked you to explain to
8 the Commission the extent of grading and land
9 configuration involved in this golf course?

10 A Yes, I would like to demonstrate that by some
11 drawings, and I guess I'll have to --

12 Q Do you want to turn it around, or --

13 A If we don't have an easel, I think I'll just
14 put them in front of you this way.

15 MR. DEMING: Will these drawings be offered as
16 exhibits?

17 THE WITNESS: They will be, I believe.

18 MR. MURPHY: That's right, yes.

19 CHAIRMAN CORKRAN: Do you want to mark them?

20 MR. MURPHY: Yes. You tell her which order to
21 mark them in.



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1 (Whereupon, the documents were marked for
2 identification Citizens Exhibits 1 through 6.)

3 CHAIRMAN CORKRAN: Would you describe what
4 each of them are before you begin to testify about each
5 one?

6 THE WITNESS: Exhibit Number 1 is a general
7 overview on the plan submitted by the developers, on
8 which I have highlighted in color the critical area
9 boundary, the 300 foot buffer, and indicated that part
10 of the development which occurs in the critical area in
11 color, with ponds and fairways and greens.

12 Number 2 is the topographic changes, the map
13 showing topographic changes associated with development
14 of this course, and I've show the mean high water tide
15 line, the critical area boundary. This is superimposed
16 upon the grading plan, which was submitted by the
17 developers.

18 Number 3 shows the same grading plan in which
19 I've highlighted in color the actual fairways and ponds,
20 which take place between the buffer and the critical
21 area boundaries.



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1 Number 4 indicates the area of grading, in
2 orange, which takes place between the 300 foot buffer
3 and the 1000 foot critical area line.

4 Number 5 is a comparative grading plan showing
5 possible development with houses at one swelling unit
6 per 20 acres.

7 And Number 6 are some representative cross
8 sections, one diagrammatic and not to scale, and two of
9 them to scale, through a portion of the area in the
10 critical area showing the amount of grading in the cross
11 section, which would take place.

12 CHAIRMAN CORKRAN: Do you have any objection,
13 Mr. Murray?

14 MR. MURRAY: The only objection I can think of
15 off the top of my head, is it appears as if some, or all
16 of these, are based upon plans that are not before the
17 Commission, that are at least one or two generations
18 old. And they're substantially different.

19 MR. MURPHY: Well, those are the plans that
20 were filed with the Critical Areas Commission.

21 MR. MURRAY: I don't think so.



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1 MR. MURPHY: We got them from the Critical
2 Areas Commission.

3 MR. MURRAY: They may have been old ones, but
4 they're not the ones that are before the Commission.

5 MR. MURPHY: Well, they were the plans that
6 were filed for approval with the Critical Areas
7 Commission.

8 CHAIRMAN CORKRAN: Well, so that we can move
9 along, how about if we look at each one of them, if you
10 don't have something wrong about each one individually,
11 and to the degree --

12 MR. MURRAY: For whatever they're worth.

13 CHAIRMAN CORKRAN: -- to whatever degree that
14 we have.

15 BY MR. MURPHY:

16 Q All right, Mr. Kutcher, will you continue now
17 and explain the degree of land alteration as you
18 analyzed it, with respect to this golf course.

19 A I think we can go directly to diagram numbers
20 4 and 5. These simply set the context how much
21 development and what kind of development is taking



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1 place within the critical area. The ponds, the greens,
2 the tees, and the fairways that are being built.

3 This is the grading itself. It's not clear
4 from this, of course, how much grading takes place.
5 What I've simply done in diagram 4 is bring out in color
6 the area where the grading takes place, which is simply
7 superimposed upon the grading plan which was submitted,
8 which as I say, is the latest one we were able to
9 obtain.

10 On diagram 4, the orange areas indicate areas
11 of either cut or fill associated with the construction
12 of the basins for drainage or the fairways or the tees,
13 which we see in diagram 3. This amounts to -- according
14 to the calculations which I've taken from the
15 developer's submittal, amounts to, within the critical
16 areas, 222 acres of disturbed land in the 394 acres of
17 critical area. Which is about 56 percent of the
18 critical area being re-graded to achieve the purposes of
19 re-directing the drainage inwards, to construct
20 fairways, tees and greens.

21 Part of this is an aesthetic goal, part is a



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1 drainage goal, which is attempting to improve water
2 quality.

3 The result are these orange patches. 56
4 percent of the critical area.

5 For purposes of comparison I've taken the
6 allowed number of houses for resource conservation areas
7 at one dwelling unit per 20 acres, and superimposed 20
8 -- actually, I think technically one can only get 19
9 with 394 acres. I put 20 in ways which I thought
10 were possibly realistic, in small clusters because of
11 the constraints of the site, wetlands, topography, and
12 so forth. I've come up with these groupings. Each one
13 has a development pad of 20,000 square feet, which is
14 taken from the recommendations from the guide to
15 development, developed by the Critical Areas Commission
16 as a general, reasonable industry standard for how much
17 disturbed land you would have per resident lot at this
18 sort of density.

19 So those four inch squares indicate the 20,000
20 square foot development pad for each of the 20 houses.
21 That amounts to roughly nine acres of disturbed land, as



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1 opposed to 222, something like two percent of the site
2 area disturbed for the one to 20 zoning versus 56
3 percent of the site disturbed for the construction of
4 the golf course.

5 Now this is only in two dimensions. That only
6 shows the area which has been graded in a flat, two
7 dimensional view.

8 We have to appreciate that there is digging,
9 and that there's filling. And generally speaking, in
10 any reasonable design, which I think this is, one tries
11 to balance the cut and fill. So this is a diagrammatic
12 cross section showing in the area of green -- I'm sorry
13 fairway number 14, and pond number 8, showing the land
14 which is -- the earth would be scooped out and then
15 filled out to create the pond and the fairway, and a
16 mound at its end.

17 This is at a scale of one inch equals ten
18 feet, and that shows the actual amount of fill, with
19 scale figures perhaps a little bit far away, scale
20 figures to show the extent. That is fairway 14.
21 There's a mound which separates that fairway from the



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1 Bay. The drainage goes gently back this way, and this
2 then is the pond which has been scooped out --
3 diagrammatically that would be this, and this would be
4 that. In each case if you can see the scale figure,
5 you'll appreciate that we are working with sometimes six
6 and eight feet of fill over an area, considerable area.

7 I did a rough, ballpark figure of the cubic --
8 cubage of excavation of cut and fill, associated with
9 the creation of the drainage basins. I have assumed
10 that most of the fill, most of the earth that has been
11 cut, will be then re-used as as fill to form the
12 fairways and the greens and the tees. So the earth that
13 has been excavated will, for the most part, constitute
14 the fill. It amounts to something on the order of --
15 and this is a ballpark figure. I've done it for
16 comparative purposes order of magnitude only, on the
17 order of five million cubic feet, or 200,000 cubic yards
18 of earth, which is a considerable amount. It's probably
19 10 or 15 times the amount that would be associated with
20 the cutting and filling of the development pads for the
21 houses.



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1 The point being that the site disturbance in
2 the construction phase, associated with the development
3 of a golf course, is considerably greater than with the
4 construction of houses under the allowed density.

5 That more or less is the point of these
6 drawings.

7 Q How big are -- what are those ponds? How big
8 in size are they in acres?

9 A Some of them are five acres. The actual
10 indication of the figures that come from the developer's
11 tables indicate drainage basins rather than the ponds
12 themselves. Sometimes the basins -- sometimes you have
13 a 20 acre basin with a five acre pond within it,
14 sometimes the ponds are a bit smaller, but some of them
15 are a good deal smaller. I would say roughly on the
16 order of five to six acres, but some smaller.

17 Q It appears that your final diagram there with
18 the people, is that showing that the mounding up will
19 be, say as high as a person in many cases?

20 A In some cases, yes, it will. And the scooping
21 out -- it seems from what I've been able to -- the



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1 counters, by the way, have not been numbered, and I'd
2 like to note that the new counters on the grading
3 program we have are shown at half the frequency of the
4 existing counters, so one has to be a bit of
5 interpolation, extrapolation, without having numbers on
6 the counters, it is a bit confusing working with these
7 drawings. But generally speaking, four to six feet is
8 being scooped out for the ponds. Sometimes more,
9 depending on the lay of the land. Sometimes up to eight
10 feet in some cases.

11 And this is then re-deposited in fairway
12 construction and the construction of greens and tees in
13 a balanced design, which is what this is.

14 Q All right, Mr. Kutcher, have you reviewed the
15 critical area regulations?

16 A Yes, I have.

17 Q Do you have anything you could tell the
18 Commission as to what you believe was meant to be
19 achieved by the prohibition on the commercial uses?

20 MR. MURRAY: Objection. The Commission
21 obviously is capable of interpreting its own



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1 regulations. That's the ultimate job as a Commission,
2 and is not appropriate for a witness to tell the
3 Commission what its own regulations means.

4 MR. MURPHY: I didn't ask that. I said what
5 is meant to be achieved by the prohibition on commercial
6 uses.

7 CHAIRMAN CORKRAN: Well, I'm going to let that
8 stand.

9 THE WITNESS: It's an interesting question
10 because we heard at the last session some speculation
11 about what constituted commercial activity. And in my
12 opinion there is a very clear reason for the prohibition
13 of commercial and industrial activity in the resource
14 conservation area, and it comes down to the definition,
15 the ordinary planner's definition, of commercial
16 activity, which is not merely activity for profit,
17 because residential activity -- residential building or
18 numerous other activities are also for profit.
19 Agriculture is for profit, as we pointed out.

20 The think which distinguishes commercial
21 activity and makes it inappropriate for the critical



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1 area is that it involves two things. First, turn over
2 of people on the site, the coming and going of people on
3 the site. This is an essential part of the definition
4 of commercial activity, which separates it from office
5 activity, or even industrial activity where a large
6 number of people, or a certain number of people will go
7 to a site, remain there for a long period of time and
8 then leave. It was the turn over of people on the site,
9 which characterizes commercial activity, turn over for
10 profit, and which makes it inappropriate to the critical
11 area because of the statement in the goals of the
12 critical area program, that the problems of disturbance
13 caused by the activity of people on the site must be
14 addressed by critical area determination.

15 So that the turn over of people on the site is
16 an element of commercial activity which makes it
17 inappropriate for the critical area.

18 The second part of what constitutes commerce
19 and why it shouldn't be there, is that commercial
20 activity, more than others, has a symbiotic effect. It
21 attracts others of the same sort of activities. Because



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1 of the turnover, because people come to the site and go,
2 commercial activity is attracted, and there are uses
3 which build up into complexes and uses.

4 In terms of golf courses this could be homes,
5 it could be marinas, it could be hotels, it could be
6 restaurants, swimming pools, tennis courts, all these
7 things cluster about the golf course use, which
8 separates it quite a bit from the ordinary idea of a
9 rather -- it does not qualify as the open use sort of
10 thing, certainly as a golf course would, it does
11 classify golf courses as a development activity, very
12 clearly, and ultimately -- just to repeat -- golf
13 courses for profit are clearly a commercial activity and
14 clearly because of the nature of commercial activity,
15 which are exemplified in the golf course, they should be
16 prohibited from the critical area.

17 Q Have you considered whether a golf course
18 meets the standards of the criteria for the resource
19 conservation area?

20 A It appears to me that golf courses, certainly
21 private ones, and possibly public ones, do not meet the



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1 criteria for a number of reasons.

2 I alluded to the -- well, we'll go directly to
3 the residential uses as compared to a golf course. One
4 of the reasons why the critical area program determined
5 that the 20 acre zoning would be appropriate was that
6 with 20 acre zoning one could, theoretically at least,
7 still maintain agricultural uses. Now agricultural uses
8 are an important plus for the critical area. They're
9 considered a protective use, they're considered a
10 resource utilization use, they are to be conserved and
11 promoted, according to the critical area program.

12 With residential use the ordinary rule of
13 thumb seems to be that with less than 20 acres you can't
14 carry on farming, so one of the reasons that was given
15 for, and the rationale for, 20 acre zoning was that with
16 residential use at that density you could still farm.
17 When it goes below that level economic pressures begin
18 to build up, and the land is sold off and becomes used
19 for other things, aside from the fact that there is,
20 with 20 acre zoning, just that much land left over for
21 agricultural use.



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1 Now with a golf course that land is taken out
2 of agricultural use, and cannot be re-used as
3 agricultural use, and as the figures point out, I
4 believe something on the order of -- in the critical
5 area in this case we have 198 acres of farm fields at
6 the moment, of which, after the golf course is
7 developed, on 34 will remain in agricultural use. We're
8 losing 168 acres, 80 percent, something like that.

9 So as opposed to residential uses which would
10 allow, theoretically, a large part of that land still to
11 be used in agricultural use. So for that reason a golf
12 course would seem to contradict the principles of the
13 spirit of the critical area legislation in not allowing
14 any substantial continuance of agricultural use.

15 There are other -- I think that probably is
16 the principal one which disqualifies golf courses.

17 Q Do you have an opinion as to whether golf
18 courses are a nature dominated use?

19 A It seems to me, on the basis of what we
20 presented here with the elaborate and extensive
21 construction that's involved, these are manufactured



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1 landscapes. They really, I don't think in the ordinary
2 sense of the term, can be considered nature dominated.
3 They may be very attractive, but they are no longer
4 nature dominated, they are man made environments.

5 MR. MURPHY: That's all I have.

6 CHAIRMAN CORKRAN: Mr. Murray?

7 CROSS-EXAMINATION BY COUNSEL FOR THE APPLICANTS

8 BY MR. MURRAY:

9 Q Mr. Kutcher, distinguishing a golf course, as
10 you put it, a manufactured environment, how would you
11 relate that to a farm field?

12 A I return to the diagrams that we've shown.
13 The nature of the golf course is, among other things, it
14 should be an interesting and aesthetic experience for
15 the golfer. This requires the creation of all sorts of
16 changes of level, changes of direction, dog legs,
17 greens, tees, sand traps, ponds, which involve
18 considerably more earth work, and change in the nature
19 of the site than the ordinary plowing of a field. As I
20 say, the amount -- the volume of earth work that goes on
21 on this site, with some 200,000, roughly, cubic yards of



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1 earth being moved at the time of construction, I would
2 think would jeopardize that delicate area of the Bay,
3 with the possibility of run off just during the time of
4 construction.

5 Q Are you familiar with the requirements of soil
6 erosion protection during a construction phase?

7 A Yes, I am.

8 Q Do you have any reason to believe that this
9 project would be unable to satisfy the requirements of
10 the law?

11 A I think it's always wise to take a very
12 conservative approach, and if that much earth is being
13 moved around right next to the Bay I would say that --
14 why even have it. I mean, if you don't have to, why
15 do it.

16 Q Do you feel the same way about disking and
17 plowing the bare earth year in and year out, since it's
18 right next to the Bay?

19 A The quantify of earth that's being moved at
20 one time is much less.

21 Q Are we talking about really what matters is



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1 volume, or are we talking about what's available to be
2 eroded?

3 A It amounts to the same thing I would have
4 thought.

5 Q You talked about the amount of land to be
6 disturbed in the critical area?

7 A Yes.

8 Q And you said it was 222 acres?

9 A I believe I took that figure from your table.

10 Q Is that disturbance defined by you -- just so
11 we'll all understand that we're on the same wave length,
12 as dirt being moved around?

13 A I understood that to mean the graded area,
14 yes.

15 Q And how much of those acres are presently in
16 agricultural use?

17 A Of the disturbed acres? I wouldn't venture
18 to guess. I suspect perhaps a hundred acres, but I
19 really have no accurate number.

20 Q Could it not be a great deal more?

21 A More than 222, certainly not.



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1 Q No, no. More than a hundred?

2 A Possibly, but certainly could not exceed --
3 you only have at the moment 198 acres in agriculture,
4 whereas you are proposing 222 acres of disturbed land.
5 So it couldn't exceed the amount of disturbance that the
6 golf course is going to cause.

7 Q Now, disturbance as you have defined it, means
8 moving dirt around, right?

9 A I understand, perhaps from the statement and
10 what he called disturbance, that's how I understood it.

11 Q Well, I just want to make sure we agree on the
12 terms, so that we can further apply it.

13 A Yes, during construction, yes.

14 Q Now while you don't see plowing apparently as
15 being as significant as other moving of dirt, is not
16 plowing, disking and so on, a form of moving of dirt?

17 A Yes, it is.

18 Q And if we were to go with the 20 acre
19 residential development you depicted, I think on your
20 Exhibit 5?

21 A Yes.



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1 Q Is it not entirely possible for all the
2 existing agricultural land essentially to continue in
3 agricultural use?

4 A I would suspect that some of it would not, but
5 it's possible that a good deal of it would.

6 Q At the same time it could all be converted to
7 turf, or any combination thereof?

8 A Theoretically, yes.

9 Q What set back did you provide for your
10 residential development in Exhibit 5?

11 A I believe the houses are something like a
12 couple hundred feet from each other.

13 Q What about from the tide water?

14 A They're all within the critical area and the
15 buffer. That is, they all respect the 300 foot buffer.

16 Q Now this 300 foot buffer, is it not the case
17 under Queen Anne's zoning that the 300 foot buffer is
18 reduced to 100 for a large lot subdivision of that type?

19 A Yes, I understand it is. However, I took the
20 300 buffer to compare apples with apples.

21 Q You indicated that the -- as you perceive it



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1 at least, the purpose of the critical area regulations
2 in the critical area of the RCA, is to avoid or minimize
3 human activity; is that correct?

4 A The goal stated in the policy section, I
5 believe it is, says that whatever development takes
6 place must assess, must address, the problems which
7 arise -- apart from pollution, the problems which arise
8 from the activity and movement of people on the site.

9 Q And people do different things?

10 A That's right.

11 Q So perhaps under your view of the critical
12 area program the ideal land use has no people on it,
13 ever, doing any thing.

14 A I don't think we're discussing -- in the real
15 world there will be people, yes.

16 Q Have you made a comparison using science as to
17 environmental costs in benefits, if you will, of the use
18 of this property in agriculture versus as a golf course?

19 MR. MURPHY: Objection. The problem with that
20 question is, is that it assumes that we're here to
21 decide whether agricultural uses are a good use in the



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1 critical area or not, does this constantly. And the
2 fact of the matter is, is that the regulations say that
3 agriculture uses are a protective use, and they're
4 specifically allowed in the critical area. And I think
5 we're going to be here a week if Mr. Murray constantly
6 seeks to demonstrate that agricultural uses should not
7 be allowed. That's been decided by describing them as a
8 protective use, and saying they are specifically allowed
9 in the resource conservation area.

10 MR. MURRAY: May I respond, Mr. Corkran?

11 CHAIRMAN CORKRAN: Yes, but let me respond
12 first. Because I did not note that he was objecting to
13 the agricultural use. I didn't think that was the
14 question. I didn't hear it that way, anyway.

15 Let me have him respond.

16 MR. MURRAY: Mr. Corkran you took part of the
17 wind out of my sails. The line of questioning does not
18 ask the witness to attempt to re-make the critical area
19 program. We all know, and it isn't debatable at this
20 point, or at least in this hearing, that agriculture is
21 recognized as a favored use. There are also a wide



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1 range of general objectives sought to be achieved by the
2 critical area program. And among them are improving
3 water quality, and habitat. And at least where it is
4 appropriate to compare agricultural use to an
5 alternative, it seems to me, those kinds of
6 considerations are relevant and appropriate.

7 It seems to me that it's all going to come
8 down to, in the end, when you make these kinds of
9 comparisons, whether or not an agricultural use is
10 better, given those kinds of objectives, or some
11 alternatives are better. That is not to say that, as a
12 matter of law, agricultural use isn't protected. We all
13 agree that the property can continue in agricultural
14 use, that's not the question.

15 MR. MURPHY: We don't have that opportunity.
16 We can't -- Mr. Murray's words, he wants us to decide
17 whether agricultural uses are appropriate or some other
18 alternatives. We don't have that opportunity here. We
19 have a set of adopted regulations that spell out the
20 permitted uses. We can't be on a fishing expedition of
21 trying to decide what are the appropriate uses in the



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1 critical area. That's been decided.

2 CHAIRMAN CORKRAN: Let's let him answer the
3 question.

4 THE WITNESS: Well, I'm afraid you'll have to
5 repeat it, because I sort of lost it in the --

6 BY MR. MURRAY:

7 Q The essence of the question is whether you've
8 done any kind of scientific study to make a comparison
9 about the environmental pros and cons, costs and
10 benefits, of continued agricultural use of this site,
11 versus its use as a golf course?

12 A I am not an environmental scientist, and I
13 wouldn't be qualified to make such a survey.

14 Q Thank you.

15 No further questions.

16 CHAIRMAN CORKRAN: Okay, fine, thank you.

17 MR. MURPHY: I'd like to conclude this section
18 by submitting some materials.

19 CHAIRMAN CORKRAN: Just a second.

20 MR. DEMING: Either Mr. Murphy or Mr. Kutcher,
21 whoever can answer the question.



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1 I just want, for purposes of clarifying the
2 record, so that the panel will know what they're looking
3 at when they sift through all the testimony and all the
4 evidence, is it your testimony, or is it Mr. Murphy's
5 proffer that these maps were obtained from the Critical
6 Areas Commission, and that they were the ones that were
7 submitted by Queen Anne's County to the Critical Areas
8 Commission back in March?

9 MR. MURPHY: That's correct. We copied them
10 from the Commission.

11 THE WITNESS: The color, of course, is my own
12 contribution.

13 MR. DEMING: Right. Then Mr. Murray, let me
14 ask you a question.

15 Are the maps that were submitted as exhibits
16 in the hearing different than the ones that were
17 submitted to the Critical Areas Commission by Queen
18 Anne's County?

19 MR. MURRAY: We may need to get somebody like
20 Ren, or somebody from Queen Anne's County to give us the
21 details, but it's my understanding that there were some



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1 refinements of some of the golf course holes,
2 specifically six, and 11 through 17, going on in March
3 and April of the year, and that they resulted in some
4 changes to those holes with respect to the layout of the
5 holes, the size of ponds, setbacks from wetland.

6 MR. BIRNEY: I could show it.

7 MR. DEMING: We're going to hear from Mr.
8 Serey later on, or would you rather do it now?

9 MR. MURRAY: Let's do it now.

10 REPORTER: I'm sorry, what is your name?

11 MR. BIRNEY: My name is Charles Birney.

12 Let's see those --

13 It's easiest to see on your number one what
14 the difference are. If you look at that --

15 MR. DEMING: Mr. Birney, could you talk to us
16 rather than talking to Mr. Kutcher?

17 MR. KUTCHER: Yes, I see what you mean.

18 MR. BIRNEY: Upper left hand corner of his map
19 and the upper hand corner of this map. You want to
20 explain that issue, or do you want me to explain it?

21 MR. LEX BIRNEY: There's some confusion about



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1 the mapping of this area --

2 REPORTER: Name?

3 MR. LEX BIRNEY: Lex Birney.

4 Originally when the plans were -- well, this
5 project has undergone many metamorphoses. This is what
6 was submitted at the hearing, and this pond here was
7 originally mapped when the critical areas line was
8 brought in as a tidal pond. Subsequent in our original
9 analysis of it, it was decided with the County that it
10 was a non-tidal pond. The course was designed assuming
11 it was a non-tidal pond, which gave a 300 foot -- which
12 substantially affected the 300 foot buffer.

13 When we came down for final approval at the
14 County level they said since it was taken to DNR, and
15 DNR has since then said that it would require a map
16 amendment, although they agreed with us, and we've had
17 biologists out there, and they have also had biologists
18 out there, to certify the fact that in fact it is a non-
19 tidal pond, which would allow that design to occur.

20 We said rather than deal with a map amendment
21 process, we would simply assume for the time being that



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1 it was a tidal pond, which then required that the 300
2 foot buffer be moved back in accordance with the
3 critical areas line, which substantially affected this
4 portion of the design of the course.

5 MR. DEMING: Would that result in less
6 grading?

7 MR. LEX BIRNEY: Well, it substantially
8 affects the design. It takes this entire hole out
9 here, and pulls a number of things back in this
10 direction.

11 MS. LANGNER: So it did pull some back out of
12 the critical area?

13 MR. LEX BIRNEY: Yes, and what was submitted
14 at the first hearing was this plan, which is this plan.
15 It's an ongoing -- it has been an ongoing process to
16 develop this.

17 CHAIRMAN CORKRAN: Thank you.

18 MR. MURPHY: I have some documents I want to
19 submit.

20 The first is a opinion from Mr. Epstein to the
21 -- actually it's to Mr. Elbrick, who's apparently



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1 associated with a interim county government. It wasn't
2 addressed to him as a critical area member, as I
3 understand it, it's addressed to him as a member of the
4 Anne Arundel County government.

5 And I would point out that -- well, I guess I
6 need a ruling on admitting this.

7 CHAIRMAN CORKRAN: Yes.

8 Mr. Murray, do you have any --

9 MR. MURRAY: I haven't had a chance to read
10 this. Mr. Corkran, I'm at a disadvantage. I've never
11 seen this before, so give me a minute.

12 CHAIRMAN CORKRAN: All right, fine.

13 (Whereupon, there was a brief recess.)

14 MR. DEMING: Mr. Murphy, while Mr. Murray is
15 reviewing that, you said you had several documents?

16 MR. MURPHY: Yeah. I want a ruling on this
17 though. Can we have that?

18 MR. DEMING: Well, we'll do that, but perhaps
19 it might be appropriate just to give the copies to Mr.
20 Murray and let him read them all. We can take a break
21 rather than doing this seriatim, and then we can just do



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1 them all at once. Would that be all right?

2 MR. MURPHY: If you want.

3 CHAIRMAN CORKRAN: Is that okay with you?

4 MR. MURPHY: That's all right.

5 CHAIRMAN CORKRAN: Let's recess for about five
6 minutes while counsel has a chance to read the
7 documents.

8 (Whereupon, there was a brief recess.)

9 MR. MURRAY: Mr. Chairman, we're looking at
10 three documents which have been proffered for
11 submission. First appears to be a photocopy of a
12 section out of the critical area regulations. We have no
13 objection to that.

14 The second is an August 7th, 1989 letter to
15 Mr. Joseph Elbrick, Jr., from Lee Epstein, Assistant
16 Attorney General.

17 I object to the introduction of that letter on
18 the ground it doesn't seem to be probative as to
19 anything that has to do with this proceeding.

20 And the third document is entitled "Final
21 Commission Draft, February '88, Guidelines for the



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1 Counting of Growth Allocation, Critical Area

2 Commission."

3 I object to the introduction of this document
4 as it too seems to have no probative connection to this
5 proceeding. It seems to only do with the subject of
6 growth allocation in connection with density of
7 residential development. There is no residential
8 component to this project, no growth allocation is
9 sought. So I fail to see what it has to do with
10 anything.

11 CHAIRMAN CORKRAN: We'll note your objection.

12 MR. MURRAY: Thank you, sir.

13 CHAIRMAN CORKRAN: But we'll allow that to
14 come in.

15 (Whereupon, the above mentioned documents
16 were received into evidence.)

17 MR. MURPHY: May I just point out that Mr.
18 Epstein is very experienced in the --

19 MR. MURRAY: I'm going to object at this time.
20 Mr. Murphy is enjoying the opportunity to make argument
21 whenever he feels like it today. We're putting on



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1 testimony at this point. The time for argument will
2 come, and it will be later.

3 MR. MURPHY: I think there was plenty of
4 argument in Mr. Murray's presentation, and I just want
5 to point out something in the letter, who Mr. Epstein
6 was. For the record I'd like to say that Mr. Epstein
7 was the Assistant Attorney General, as far as I know,
8 assigned to the Critical Area Commission from its
9 inception, very knowledgeable with respect to the
10 Critical Area Commission.

11 The letter speaks for itself, but I'd just
12 like to point out on page two that Mr. Epstein says, in
13 discussing RCA's, "RCA's the most conservation oriented
14 of the three categories, are intended to be nature
15 dominated or natural resource utilization districts,
16 i.e. areas where farms, forests, open land, and areas of
17 natural habitat predominate. The only other appropriate
18 land use in RCA's, for the most part, are residential
19 uses at a density not to exceed one dwelling unit per 20
20 acres."

21 The second document I've introduced is a



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1 document entitled "Guidelines for the Counting of Growth
2 Allocation, Critical Area Commission." This is, as I
3 understand it, was an official document adopted by the
4 Critical Area Commission to deal with the subject of how
5 you count utilization of the growth allocation.

6 I just point out some of the statements in
7 this document, which I think are relevant to what we're
8 talking about in the RCA.

9 The bottom of page two it says, "Conservation
10 of the protective land uses of agriculture and forests
11 was also an objective of the Commission."

12 The bottom of page five it deals with the
13 subject of how much land you count when you partially
14 develop, and it speaks of the development pad, as Mr.
15 Kutcher said, which included any areas subject to human
16 use, such as active recreation areas. That was to be
17 included in the development pad.

18 And also, the remainder of the parcel would
19 not count against the county's growth allocation if it
20 was contiguous and retained at least 20 acres in size,
21 retained its natural features, or its use by resource



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1 utilization activities, agriculture, forestry, fisheries
2 activities, or aquaculture, and was restricted from
3 future subdivision and/or development through
4 restrictive covenants, conservation easements,
5 or other protective measures approved by the Commission.

6 This is an official critical areas policy
7 document.

8 The final document I'm introducing is a
9 portion from my Bible for these proceedings, which is
10 the Critical Area Regulations.

11 The regulations define resource conservation
12 areas, and I just want to end this portion of my
13 presentation by just reading this definition to you.

14 "Resource conservation areas are those areas
15 characterized by nature dominated environments. That
16 is, wetlands, forests, abandoned fields, and resource
17 utilization activities that is agriculture, forestry,
18 fisheries or aquaculture."

19 In deference to Mr. Murray I won't make any
20 argument on those points.

21 My next witness will be Mr. Brinsfield.



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1 Whereupon,

2 DR. BRINSFIELD,

3 a witness, called for examination by counsel for the
4 Citizens for the Preservation of Queenstown Creek, was
5 duly sworn, and was examined and testified as follows:

6 REPORTER: Will you spell your name, please,
7 for the record?

8 THE WITNESS: B-R-I-N-S-F-I-E-L-D.

9 EXAMINATION BY COUNSEL FOR THE CITIZENS

10 BY MR. MURPHY:

11 Q Now Mr. Brinsfield, what is your occupation?

12 A I am currently the head of the University of
13 Maryland Wye Research and Education Center, and I am
14 trained in the area of agriculture engineering, with a
15 specialty in environmental sciences.

16 Q What is the most advanced degree that you
17 hold?

18 A I have a Ph.D in engineering.

19 Q And have you published any papers in the
20 field?

21 A Yes, I have.



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1 Q And you've done research in the area of
2 agricultural uses and soil science?

3 A Yes, I have.

4 Q Have you reviewed the plans for the
5 development of this Queenstown golf course?

6 A Yes, I have.

7 Q Did you also review the environmental effects
8 report, and the best management study?

9 A Yes.

10 Q Did you also review the stormwater management
11 study?

12 A Yes.

13 Q Even with the appendices?

14 A Yes. Well, I must admit I didn't go through
15 all the appendices.

16 Q They were that separate thick volume?

17 A Right.

18 MR. MURPHY: I would offer Dr. Brinsfield as
19 an expert in the field of water quality.

20 CHAIRMAN CORKRAN: Do you have any objection,
21 Mr. Murray?



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1 MR. MURRAY: The qualifications that I heard
2 him go through did not specifically include water
3 quality. The man may well be qualified, but we heard
4 about engineering, and agronomy, and farming. We didn't
5 hear anything about water quality.

6 THE WITNESS: I have since 1980 -- let me just
7 set the record straight. Since 1983 I have been
8 involved in investigating the environmental consequences
9 of various land use practices on Chesapeake Bay surface
10 water and ground water, specifically focusing on
11 agricultural issues, most predominately agriculture.

12 MR. MURRAY: No objection.

13 CHAIRMAN CORKRAN: Okay, fine.

14 THE WITNESS: I have published extensively in
15 the Journal of Environmental Quality, and other --

16 MR. MURPHY: I offer Dr. Brinsfield as an
17 authority in the field.

18 CHAIRMAN CORKRAN: We'll accept that.

19 BY MR. MURPHY:

20 Q Dr. Brinsfield, I'm not going to ask you a
21 series of questions, I'm just going to ask you if you



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1 could explain to the Commission your analysis of this
2 project, and how the water is going to be handled and
3 transported on the site and off the site in connection
4 with this golf course?

5 A Sure. What I would like to do is do that in a
6 bit more general context, since I did not review, you
7 know, in real detail every nook and cranny of this
8 project, but I think conceptually we can talk about
9 water budgets, and then we can focus in on this project

10 --

11 MR. MURPHY: One thing I also want to make
12 clear is I went to Dr. Brinsfield as an expert in the
13 field. Now he wants it clarified, he's not speaking
14 here on behalf of the University of Maryland, nor is he
15 taking a position to the Commission officially that this
16 course ought to be disapproved or anything of that
17 nature. He's here to offer his expert scientific
18 advice.

19 THE WITNESS: I have no opinion.

20 (Laughter.)

21 BY MR. MURPHY:



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1 Q All right, Dr. Brinsfield, go ahead.

2 A May I stand?

3 Q Sure.

4 A One of the things that we realized early on in
5 our research in looking at the effects of agricultural
6 practices on surface water run off, or ground water, is
7 that the first thing that you really need to be able to
8 understand well is the water. And be able to develop a
9 water budget.

10 And what I mean by a water budget, you need to
11 be able to take all of the inputs that are going onto a
12 field by rain or by irrigation, or by whatever, and then
13 account for the flow paths that that water takes, either
14 in surface water run off, vapo transpiration, leeching,
15 or whatever.

16 And it's in that framework that I've been
17 asked to kind of review the proposed golf course best
18 management practice, and talk to you conceptually about
19 where water goes and why. And in doing that what I'd
20 like to do is just draw you a really, really, simple
21 graph, because I think one of the things that we



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1 sometimes fail to realize, even in the scientific
2 community, is the relationship, particularly between the
3 shallow ground water and the Chesapeake Bay. Okay? And
4 that they are integrally linked. Years ago we used to
5 think that you could control surface water run off --
6 you stopped surface water run off, and you're stopping
7 any kind of transport of any pollutant to the Bay
8 itself.

9 Well, in fact if you stop surface water run
10 off you are stopping sediment transport, but just
11 because you're stopping sediment transport does not
12 necessarily imply that you're stopping anything that's
13 dissolved in the water column, vis-a-vis nitrogen or any
14 other soluble material, because there's other flow paths
15 where that nitrogen or chemical can get into the Bay.

16 So if we just real quickly, if we were to look
17 at some body of water out here -- it could be the
18 Chester River for example, and we look at the uplands,
19 up here where we're farming, okay. Underneath this
20 whole system we have running what we call a confined
21 aquifer. That would be like the Columbia aquifer, or



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1 it could be the Pales aquifer, or something like that.
2 Generally in lots of cases it does not even intersect
3 with the bottom of the Chesapeake Bay itself. It may
4 run a hundred feet below, two hundred feet below.

5 But above that we have what is called the
6 unconfined aquifer. Now the unconfined aquifer is that
7 area above a predominately confining layer. And what I
8 mean by confining layer, it's something, it's a surface
9 at the soil that's very permeable, that the amount of
10 water that moves through that soil is very -- it's a
11 very slow rate, okay. The infiltration is very slow.

12 So we have this unconfined aquifer that sits
13 above the confining aquifer that is linked to the
14 Chesapeake Bay, and the way this is linked is, if we
15 were to look at the water that's in the Bay itself, and
16 have some sort of a sea level that would run across
17 here, and in the fall and the winter when we get water
18 falling on the surface of the earth, and plants are not
19 growing, we get water that infiltrates down through our
20 soil column, okay. And what happens is in the fall when
21 a crop is not growing you can envision this soil



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1 profile, kind of like a sponge, and that sponge is not
2 full, because during the cropping year the crops have
3 taken up more moisture than put in there by rainfall,
4 okay.

5 But in the fall when there's nothing growing
6 out there -- I'm talking December, January and February,
7 this sponge tends to fill up. You get more water going
8 into the soil, no E.T., you get some surface water run
9 off -- I'll talk about that issue later -- but after a
10 while that sponge gets full and what happens is your
11 water table starts to rise, okay, like this.

12 So by now, particularly since we've had a
13 really wet spring, if you were to go out and under any
14 of these fields, these agriculture fields, particularly
15 on the Eastern shore of Maryland where the depth of
16 ground water is really close, you'll see that -- like on
17 our studies say at the Wye Research Center right now,
18 the water table is about two feet from the soil surface.

19 So at the peak of recharge your soil, your
20 water table itself, that unconfined aquifer, can be as
21 close -- and in some cases it's actually right to the



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1 surface of the earth, but for practical terms it's
2 usually a couple of feet below, okay. So that happens
3 all during the winter.

4 In the summer, in the spring, when the farmers
5 go out and plant their crops, and the sun starts shining
6 really bright, you start getting a lot of evaporation,
7 and transpiration by the corn crop that's growing, what
8 happens is as you continue to get rainfall then E.T.
9 kicks in and starts pulling water back out. So when you
10 think about that sponge it's starting to not be full
11 again, okay, the water is coming out of that.

12 Now what we have observed in that cycle is
13 that if you continue to monitor the height of this water
14 table below that soil profile, during the spring and the
15 summer and the fall when we know that no water is
16 getting into the unconfined aquifer, because we monitor
17 that and we know when we start to get re-charged, what
18 we notice is that this water table declines, okay,
19 starts to go down. It will start to go down to where it
20 was maybe the year before. So the question we started
21 asking was what is happening to that water, where is it



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1 going.

2 We know that it's far enough down below the
3 soil surface to where capillary action is not causing
4 that water to come back up. So the water -- and the
5 water table keeps going down, we know that we have a
6 relatively confined layer here, as very little of this
7 water gets into our confining layer. We know that the
8 water table goes down, so the only other place for this
9 water to go, and what it does slowly, is it goes to --
10 water flows downhill. So it would go to your marshes,
11 or to your feeder streams out in the woods. As a matter
12 of fact if you walked into the woods in August
13 sometimes, and you've seen a stream flowing and it
14 hasn't rained for a couple of months, you may have kind
15 of wondered where that water is coming from. Well, that
16 water is coming from the uplands. It's coming from the
17 agriculture fields, and from developed areas, or
18 whatever.

19 So the point that I want to make is that
20 whatever we do on the soil up here, whether it be a
21 residential area, whether it be agriculture, is



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1 intimately linked to the Chesapeake Bay. Now what
2 happens is this water table tends to go down. It very
3 seldom ever gets to sea level, but it's gotten as close
4 as two feet above sea level in our study areas in
5 August. Because you have two things happening. As it's
6 head decreases, the flow velocity decreases, okay, so
7 the water starts moving slower; as your head builds back
8 up this water velocity increases.

9 So if you were to have arrows representing
10 where this water is going, you'd have a really small
11 arrow for the amount, the volume, that gets into the
12 confined aquifer. You'd have a real fat arrow for what
13 gets into the Chesapeake Bay, eventually gets into Wye
14 River and Queenstown Cove and wherever else.

15 So the point that I want to make in
16 understanding this is, that you can clearly see that
17 anything that is dissolved in the water that moves
18 through the soil profile, that gets in this water table,
19 is free to move. And in fact, once it gets out of the
20 primary root zone, because there's not very much
21 biological activity going on there, nitrate and some of



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1 your pesticides, they simply don't break down, they
2 simply move wherever the water goes, and so that's the
3 importance of understanding the relationship between
4 what happens and what we do on the soil profile, and
5 what happens to the water as it moves down through.

6 Now with regard -- since you're understood
7 this, let me just give you some rough numbers based on
8 our study. Let's just assume that we get 40 inches of
9 rain per year. Okay, on an annual budget, that's a
10 little low for Eastern shore, but let's just look at
11 that. In our studies monitoring surface water run off,
12 we have studies designed where we capture all the water
13 that leaves a field, and we've done that since 1983. We
14 measure how much water goes down through, we measure the
15 height of the water table, we measure E and T so we can
16 do a water budget. And what generally we have come to
17 find out is that of this 40 inches of water on Matapeake
18 soils, which are some of the ones that are in the
19 proposed study area, and there's some lighter and some
20 heavier, so on average it appears to be a pretty good
21 example of how we could expect water -- design our water



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1 budgets. We lose less than ten inches in run off, much
2 less than 10 inches in run off. And this is under
3 conventional till or no till. We're comparing
4 conventional till farming and no till farming.

5 We have about 15 inches to 20 inches in E plus
6 T, okay. That leaves about 15 to 20 inches that do down
7 through the soil profile. So on a kind of annualized
8 basis if you were to kind of do a rough water budget,
9 half of the water that falls onto our fields becomes a
10 part of our unconfined aquifer.

11 So the main point that I want to make, and
12 that's in relation to a very well designed setting that
13 these gentlemen have proposed, they are suggesting, or
14 they have done a very good job of focusing on
15 controlling surface water run off, okay. But they have
16 made the assumption that by controlling surface water
17 run off that you're controlling water quality. And that
18 may or may not be the case.

19 If you control surface water run off, or if
20 you reduce your surface water run off component to zero,
21 that water has to go somewhere. Now they're going to



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1 have ponds that are going to capture a fair amount of
2 this, but they're also going to have irrigation system
3 installed where they keep those ponds full, so when you
4 get large run off events that are going to be
5 captured by the pond, they've got, of course, designed
6 spillways for that water to flow over.

7 But the other thing that you need to realize,
8 and looking at some of the literature, and there again
9 I'm not an expert in golf, but I read some articles this
10 weekend, that not only that as you move from an
11 agricultural field to a turf field, on a given same
12 slope, surface water run off decreases just as a
13 function of the type of material from -- you know, if
14 you're cropping it you would have one run off, and if
15 you go away to turf you have another. So they're going
16 to significantly reduce run off simply by going to turf,
17 but still that water has to go somewhere.

18 Now some of that is going to be captured by
19 the ponds, but some of that is going to result in
20 increased infiltration. And when you superimpose on
21 that irrigation scheduling to keep those greens and



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1 farrows nice and wet and keep the grass growing, what
2 you have basically from a water budget point of view,
3 you have a soil profile that throughout the year is a
4 sponge that's full, okay. So if you irrigate to
5 maximize the growth and to keep the greens looking nice,
6 then any natural rainfall event that might occur
7 immediately after you irrigate could create a situation
8 where your sponge is full, and you could result in
9 leeching of water out of the red zone, okay.

10 So that's the main point that I wanted to
11 make, John, in terms of my own comments.

12 Would you like to explore that a bit farther,
13 ask some specific questions?

14 Q Well, what does E.T. mean?

15 A "E" is evaporation itself. The sunlight
16 shining directly on the soil surface will cause moisture
17 to come out. The "T" is transpiration, and that's the
18 moisture that's removed from the soil profile, the root
19 system of the growing plant has taken up to cause the
20 plant to grow. So when you combine E and T, is what I'm
21 talking about, what they call E.T.



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1 Q And I take it what you said was that the
2 studies you read, prepared by the engineers, did address
3 the question of surface water run off?

4 A Yes, absolutely.

5 Q But did those studies address -- what do you
6 call it, ground water?

7 A The movement of the water into the unconfined
8 aquifer.

9 No, that's one of the questions I really had,
10 was were these ponds that they're proposing lined, or
11 were they not lined. If they're not lined then you're
12 probably going to get a fair amount of that moving down
13 directly under the ponds. If they're lined, then the
14 question I have is what's going to happen to all the
15 extra volume of water that you'll get when you get
16 surface water run off, assuming that they maintain
17 the ponds full for aesthetic reasons.

18 Q But even -- let me just go over those figures
19 you have there. Those figures were on a farm field,
20 right?

21 A Yes. On about a 15 to 20 acre -- well, about



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1 50 acre study site, divided in two study areas.

2 Q Okay, but you were saying, I think, that those
3 figures, 15 to 20 inches goes directly down?

4 A On an annual budget. It doesn't all go at one
5 time.

6 Q I understand that, but it goes directly down?

7 A Right.

8 Q On a farm field. And you also said that the
9 turf tends to hold the water better than a farm field
10 would?

11 A Right. A couple studies I looked at,
12 particularly one done at Penn State, a very nice
13 Master's thesis by a young fellow, on a nine percent
14 slope he had to make it rain the equivalent of six
15 inches per hour to produce surface water run off. Now
16 a six inch in an hour is greater than a hundred year
17 frequency storm, so on a nine percent with a well
18 established turf the amount of run off that you're going
19 to get even if you don't do -- in other words, if you
20 took that farm and turfed it, put sod in it, and left it
21 just as it is, you're going to significantly reduce



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1 surface water run off by itself, without ponds or
2 anything.

3 Q Right. But --

4 A It's what appears --

5 Q So that would be a reduction there, but it's
6 not necessarily a reduction in the amount going down to
7 the ground water?

8 A No. As a matter of fact, as you reduce the
9 amount that runs off, unless E and T account for it, you
10 have to increase the amount that goes down.

11 Q So there would be more --

12 A The water has to go somewhere.

13 Q There would be more going down to the ground
14 water?

15 A Right. Or headed down through the roots, and
16 may or may not get to ground water.

17 Q So that's a difference in comparing a golf
18 course to a agricultural area, that generally there'll
19 be less water run off, but there will be more going
20 straight down to the ground water?

21 A Particularly if you superimpose on that



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1 irrigation.

2 Q All right, let me ask you about that. Now I
3 want to make clear on what this sponge effect is.

4 The irrigation, you're putting more water on
5 the sight --

6 A Right.

7 Q -- but it's -- I gather you're saying the
8 water transfers more quickly through the ground when
9 it's saturated; is that the idea?

10 A No, not necessarily more quickly, but if you
11 have a sponge that's full already --

12 Q It can't hold any more.

13 A -- and you put more water in the top, water
14 has to come out the bottom, so it's a function of the
15 fact that -- you see, in natural systems without
16 irrigation, and large scale agriculture, natural systems
17 what happens is once the plant comes up and starts
18 growing, if you take and look at the total water --
19 total rainfall that gets in the root zone, and compare
20 that to what the plant requires to grow, we have not had
21 hardly ever a case in our studies since 1983, to where



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1 once the plant is up and growing that there's so much
2 water going in the top that it leeches out the bottom.
3 The sponge is always less -- the soil profile is under
4 field capacity. Field capacity is the volume of
5 water per unit -- it's the amount of water per unit
6 volume that the soil can hold. Once you exceed that it
7 comes out the bottom, okay. As long as you stay below
8 that then the sponge will take more water without taking
9 it out of the root zone.

10 Q Is what you're saying is, is that the
11 irrigation tends to fill up --

12 A Keeps the sponge full.

13 Q -- tends to keep the sponge full?

14 A Right.

15 Q Whereas naturally it would not be full at
16 certain times of the year?

17 A That's right. It would dry out from about the
18 beginning of May all the way through, depending on the
19 year, but could be until November or December.

20 Q Well, based on the --

21 A Based on our studies. We monitor, we have



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1 lycimeters installed two feet below the soil profile.
2 If you have a soil profile here, we go down two feet,
3 and we have lycimeter tubes installed under the soil
4 itself, and have a large collection device over here.
5 This is your soil, okay, and here's a collection device.
6 From about May all the way through November we never
7 collect samples in these lycimeters. That means that
8 this whole soil profile, two feet above those lycimeters
9 are under field capacity, under natural systems, growing
10 corn.

11 Once we harvest the corn in November,
12 December, we start collecting our samples here, and then
13 immediately following that we get a response to the
14 water table down below. The water table at that point
15 may be 15 feet down, this may be two feet.

16 We get the response, the water table starts to
17 rise, okay, so that's how -- conceptually, that's how
18 these systems in coastal plain soils work. So anything
19 that is dissolved, that's in the matrix, in the soil
20 matrix, dissolved in the water, wherever the water moves
21 it has a tendency to move. And our studies on natural



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1 agricultural systems always, for example, in the fall
2 when we first start collecting our samples, we always
3 get the highest nitrate and concentrate sample at the
4 very beginning, that we will see for the whole year. So
5 it tends to flush the soluble nitrogen out of the root
6 zone, and it starts to head for ground water. And as
7 you flush more and more water through that column
8 there's less nitrogen available, because you're not
9 putting any more on, the concentrations of nitrate in
10 these lycimeters tend to go down.

11 And by the following spring they're basically
12 to zero because all the nitrogen is gone. Then the
13 farmer puts fertilizer on again and it does it again.

14 Now the concentrations, or range, is a
15 function of the growing season. If you have a really
16 good year, you have lots of moisture, you get a high
17 yield, then your concentrations at the end will be lower
18 than if you have a dry year like we've had where your
19 yields are low, and then you get that flushing action
20 and these concentrations can be very high.

21 Q But you're saying the nitrogen from



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1 fertilizer, it goes down through the soil to the ground
2 water, right?

3 A Right.

4 Q Have you compared -- you read the
5 environmental effects report, and saw the amount of
6 fertilizer they were planning on putting down on the
7 golf course. Did you compare that with your knowledge
8 about how much fertilizers are put down on farm fields?

9 A In the total amount there fairly -- they're a
10 little bit over, but they're not way out of line with
11 what we would recommend for corn.

12 Q So it's roughly the same?

13 A Roughly the same. I think they recommended
14 they were going to put it on three different times, or
15 maybe four. So that part is really good. So they're
16 putting a smaller amount on, they're putting it on more
17 frequently, so that makes a lot of sense. The risk
18 comes in the fact that you've got a sponge that's full
19 all the time, so if they put it on, and they tend to
20 like to irrigate immediately after application, then
21 what happens is you've got a sponge that's full and if



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1 you get a rainfall after that then you've got tremendous
2 risk of leeching. The exact same problem that we have
3 with the farmers, they grow corn under irrigation. We
4 constantly have to encourage them to watch when it's
5 going to rain and not irrigate just before a rainfall
6 for fear of filling the sponge and causing leeching.

7 Q So if I ask you, based on your study of this
8 project and what you know about research and
9 agriculture, can you tell us whether there will be more
10 or less nitrates going to the ground water than there
11 would be with agriculture?

12 A Well, it's hard for me to say. Looking at the
13 studies that I reviewed, one done up at Cape Cod which
14 had some results a little bit different than the one at
15 Penn State. The one at Penn State had fairly low
16 nitrogen leeching numbers at six inches below the soil
17 profile. The study done at Cape Cod showed
18 concentrations in ground water that were about what we
19 would see if it were in corn. In a worst case scenario
20 in agriculture. What I was a bit surprised about with
21 the Penn State study, and also the -- more so the Penn



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1 State study than the Cape Cod study, was the
2 concentrations of pesticides in the shallow ground water
3 were higher under the turf managed scenario by far than
4 we see of those same herbicides under agricultural
5 systems, okay. Because they put 24D dycambil (phonetic)
6 on several times during the year, where in a farming
7 system they put it on once, and they put it on when the
8 sponge is not anywhere near full, so the risk of that
9 leeching out is much lower than it would be if the
10 sponge were full. So it's a function, again, of the
11 water budget where the water goes.

12 Q All right. You heard me, I guess, in my
13 opening statement say that we don't know which way
14 really the ground water runs under the surface; is that
15 correct?

16 A That's right. You'd have to do a detailed
17 study, but generally speaking, you know, there's some
18 place out in the middle of that large farm where there's
19 kind of a water divide, you know, and that -- the water
20 to the right of that moves to Queenstown Cove and the
21 water to the left of it moves somewhere else. But in



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1 order to understand that there would have to be a fairly
2 detailed study. But it moves somewhere, and eventually
3 it becomes a part of a surface water system, okay, so --
4 I cannot address, and will not address where it goes.

5 Q You don't know where it goes?

6 A I will say that it becomes a part of a surface
7 water system somewhere, because that's the way the
8 system works.

9 Q Becomes part of tidal waters, I guess?

10 A Tidal waters. It can feed into your marshes,
11 to whatever, but yes, it has to become a part of tidal
12 waters.

13 Q But if you were concerned, say, about the
14 water quality of Queenstown Creek, you wouldn't know
15 from what we know now as to whether this golf course is
16 -- ground water will be going into Queenstown Creek or
17 going into the Chester River or where?

18 A No.

19 Q What do you do to do that? Is that a hydro-
20 geologic study?

21 A Yeah, you have to do a fairly detailed study.



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1 I mean, you can do a detailed study where you can
2 actually calculate -- we're doing this on a research
3 project now -- calculate the flow velocities across the
4 shallow ground water surface water interface, the
5 directional flow, the flow velocities, you can actually
6 calculate a flux of a pollutant across that interface
7 boundary. But that's a fairly extensive study to do
8 that.

9 But you can, with a grid of wells, and using
10 some hyzometers and other things, you can determine the
11 direction of flow of the water under the proposed area.
12 That can be done.

13 Q Can you also -- are there models that exist
14 that you could analyze the types of soil on the site,
15 and the proposed nitrogen and -- fertilizer, excuse me,
16 and pesticide use, and the expected irrigation, and then
17 could you make scientific determinations as to
18 approximately how much would be going into the ground
19 water?

20 A Yeah, but you -- you can do a fairly rough job
21 of that, based on intensity and duration of storm events



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1 in that area. I mean, there are records where you could
2 do that, yes. You could do that. You'd have to get a
3 long term rainfall record for that study area, which --

4 Q But that would give you a more precise
5 evaluation of the expected nutrients --

6 A Generally speaking it probably is not worth
7 doing because generally speaking this is what happens in
8 coastal plain soils. I mean, I think we're close enough
9 to know that half of the water of natural rainfall, half
10 of what we put on gets into shallow ground water. I
11 mean, it's simply that clear, and to spend a lot more
12 money trying to figure out whether it's 41 or 40 or 38
13 or 20, is probably not meaningful. What is meaningful
14 is to understand more about the destination of the
15 shallow ground water once it has gotten into that
16 unconfined aquifer, and where it's going and how fast
17 it's going, and what's dissolved in it.

18 Generally speaking, for example, nitrogen
19 under agriculture eco-systems, once the nitrogen is
20 dissolved and in the shallow ground water it tends to
21 stay the same. I mean, you get some apparent



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1 degradation as you move towards the estuary, but what we
2 have found out is if you do a tight water budget, even
3 though the concentration may be lower, the volume of
4 water relative to that concentration is higher so the
5 flux is about the same. So that's what has got us on to
6 this that there is a fair amount of the nitrogen that
7 gets into shallow ground water no matter where it comes
8 from, ends up becoming a part of the Bay system. And in
9 fact in coastal plains soils it's by far the primary
10 transport path of nitrate, or the pesticides into the
11 Bay or its tributaries, in coastal plain soils.

12 Now as you get in steeper slopes then that's a
13 whole different story.

14 Q Okay, then what you're saying is you're
15 confident enough that based on your experience you know
16 that a certain percentage of the nitrates, and the
17 pesticides, I guess, will go down through the ground
18 into the ground water, and become part of the ground
19 water system?

20 A That's right.

21 Q And what we don't know is where they would



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1 flow from there?

2 A Right. And the other concern, depending on
3 where you are, it may not be true in this area because I
4 think a lot of people have their domestic wells maybe in
5 the confining layer, but if for anyone who had their
6 domestic well in the unconfined layer, then they're
7 drinking that water as well. Now down in Dorchester
8 County, down that way where people do have their
9 domestic wells in the unconfining layer then we worry
10 about the human health risk as well.

11 Q But the -- if you wanted to address nitrate
12 loadings in the tidal waters, it would be a relevant
13 circumstance to know whether this -- the nitrate from
14 the golf course would be coming into those waters?

15 A Yes. I mean, if you really want to
16 understand it that's what you'd have to do, is a
17 detailed ground water study.

18 MR. MURPHY: That's all I have, thank you.

19 CHAIRMAN CORKRAN: Okay, fine, thank you.

20 Mr. Murray?

21 CROSS-EXAMINATION BY COUNSEL FOR THE APPLICANTS



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1 BY MR. MURRAY:

2 Q Dr. Brinsfield, you haven't done any
3 investigations on this particular site?

4 A Absolutely -- I haven't even seen the site.

5 Q So you don't know any details about the water
6 table specific to the site?

7 A No, but I can address the issue of water table
8 relatively speaking, in coastal plain soils of the
9 Matapeake swell, relative to the Bay position, exactly
10 the same, being the study area that we have, and it
11 being -- the study area that I'm investigating
12 interfaces a tributary of the Chesapeake Bay.

13 Q So you're saying --

14 A It is within the critical areas, actually.

15 Q So you're saying, basically as I understand
16 it, that such site specific data is not relevant to such
17 an evaluation?

18 A No, no, what I said was the general flow
19 patterns that we've experienced at our study site, I
20 think are transferable to your study site.

21 Q What is site specific is the specific flow,



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1 velocities and directions of the water under the
2 proposed golf course in relationship to Queenstown Cove,
3 it would have to be investigated.

4 A Well, it's going to vary. It depends on when
5 you want to measure it. If you go out and measure it
6 now, it's going to be very high. If you go out there
7 and measure in August or September, it's going to be
8 down.

9 Q I understand. My question is, comparing one
10 site to another, assuming that there are either specific
11 days or averages, with variations in water table, is it
12 irrelevant, or does it matter?

13 A Oh, it matters. It matters because the
14 closer that your water table gets to the soil surface,
15 the more important it is because the more of whatever is
16 in that root zone is now going to become a part of the
17 groundwater system. So, as that groundwater tends to
18 recede, then whatever has dissolved and become a part of
19 that is going to go with it.

20 For example, if you could say for sure that
21 the height of the water table is never ten feet or



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1 closer, than that is more significant than if it is five
2 feet. Okay.

3 If it is two feet or three feet, then probably
4 it doesn't matter.

5 Q It's a matter of degree?

6 A Yes. Sure.

7 Q You talked about nitrates, I believe,
8 specifically at some length.

9 A (Nods head affirmatively.)

10 Q And you talked about, at least as I recall
11 your discussion, dissolved nitrates?

12 A Well, dissolved nitrogen, which is a nitrate.
13 The nitrate is the fraction that we're worried about,
14 because it's what is dissolved in the water column
15 itself. It's dissolved and you can't see it. So, the
16 nitrate is what everything -- like a ten part per
17 million standard, that's a nitrate. Not total nitrogen,
18 or not ammonia. That's the nitrate.

19 Q Now, are all nitrates water soluble?

20 A All nitrogen is -- almost all nitrogen is
21 going to be water soluble because that's how it is taken



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1 up by the plant.

2 The preferred form is nitrate, although
3 ammonia as a gas can be taken up some as well. But the
4 primary -- I mean, that's why we put fertilizer on.
5 That turns into nitrate or is nitrate right up front,
6 because it's soluble and it's taken up as the water is
7 taken up by the plant. Okay?

8 Q But chemically, there are --

9 A Oh, sure.

10 Q -- either less soluble or non-soluble forms?

11 A Yes. There's other forms of nitrates, of
12 course.

13 Q And does your model assume, basically, soluble
14 forms?

15 A We look at all. We look at all of them. We
16 look at the gas. We look at the NO₃. We look at the
17 total. We also look at not only the inorganic, but we
18 look at the organic fraction.

19 What we have come to realize is that of all
20 the whole pool -- that we look at in these agricultural
21 systems, the nitrate is the predominant form that



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1 nitrogen moves around in the system and is taken up by
2 the plant, and is the predominant form that leeches down
3 and becomes a part of the natural system. Okay?

4 No. There are other forms. But that's the
5 one we focused on, because that's where most of the
6 action is.

7 Q Did I understand you to say that there was no
8 dilution in the net, looking at the groundwater -- the
9 nitrates?

10 A Here's what I want to explain to you. If you
11 have the edge of a field and go down -- here is a body
12 of water, like on the Chester River today. Okay. What
13 I'm saying is, if you've got a farmer that's farming --
14 I'm talking about agriculture, because that's where my
15 research is.

16 If you've got a farmer that's growing a crop
17 out here, okay, you've got the water table that's
18 running down like this, and you put a grid of wells in
19 like that, all of this is in the water table now. We're
20 down 15 to 20 feet below.

21 If you pull a sample out of these on a given



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1 day, all right, you look at the concentration, it may go
2 from 10 parts per million, down to .1 parts per million.
3 Okay?

4 So, what has been assumed in the past is that
5 you're getting breakdown of the nitrogen pool, and even
6 though you've got a fair amount getting in here, very
7 little of it is becoming part of the Bay system.

8 But in fact, if you were -- and we are looking
9 at this now in some detail. If you were to be able to
10 account for the water volume associated with each of
11 these samples, in that you've got -- you've got water
12 that's falling down on here. You've also got water
13 that's coming -- saltwater intrusion coming from the
14 Bay, back up in here. And you were to account for that
15 water volume that you would see if you looked at the
16 flux of that, pounds -- per whatever, that it would be
17 more similar to this, and not this.

18 And as a matter of fact, if we did that, we
19 plotted for example nitrate and over here we plotted
20 chlorides, and this would be the edge of the field, and
21 this would be the edge of the estuary, if you looked at



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1 nitrates, they go like this, but if you look at
2 chlorides, they go like that. Okay?

3 So, what you've got is, you've got -- and the
4 chlorides are coming from the estuary, from the mixing
5 that's going on here. Okay?

6 So, the chlorides are going this way, the
7 nitrates are going that way. That implies there is a
8 large volume of water in here that's not being accounted
9 for when you simply do concentration kind of data.

10 And in order to look at that flux, that
11 loading across this interface boundary, you've got to do
12 a water budget under there, and it's very difficult to
13 do. But that's what we're trying to do now. So, that's
14 what I'm saying.

15 But you can't assume that just because you've
16 got a decrease in your wells, that you've got a decrease
17 in loading. It may be the case, but it may not be.

18 Q Well, just your own graph, assuming it
19 illustrates your point, at least half of that line
20 precedes the interface. I mean, what accounts for that,
21 if not a decrease somehow --



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1 A Because you've got more water in here and it's
2 being -- I mean, there's a whole large mixing area
3 that's going on under there.

4 I mean, it's not quite linear like that, but
5 the point is that one goes down as the other comes up.
6 You have a very large mixing area. You've got more
7 water that's coming in from here. More water that's
8 coming in this way. I mean, it's a very dynamic system.
9 And I'm just trying to point out that you simply can't
10 assume a change in concentration of a well, as being --
11 as saying that there's less nitrogen and it's moving.
12 That's all I'm trying to point out.

13 Q It may mean that?

14 A It may or may not. All I'm saying is,
15 traditionally, historically, it has been assumed that it
16 means it is not.

17 Q And you are exploring whether that's true or
18 not?

19 A Right. We have some indication -- we have
20 some things that suggest that that in fact is not the
21 case, that in a lot of cases, that --



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1 Q Do you have the expertise to comment on what
2 happens to a molecule or the nitrate once it is in the
3 groundwater, in terms of its life cycle?

4 A Well, unless there is something to break it
5 down, it hangs right in there.

6 Q So it basically is a permanently stable
7 molecule?

8 A Yes. It's an element. I mean, you'll have
9 bacteria to break it down, or something to take it up.
10 I mean, if you've got temperatures -- if you've got
11 groundwater temperatures of 45 to 50 degrees, the
12 microbial activity is very low. Now I'm getting -- I'm
13 not an engineer, so I'm getting kind of out.

14 But generally speaking, in order for it to
15 change, there has to be either a degradation process, a
16 transformation, or there has to be some dilution. I
17 mean, you're dealing with a fixed amount, so something
18 has to happen to it.

19 Q The nitrate, you're telling us, is an element?

20 A Well, nitrogen is an element in general. I'm
21 just saying, something has to happen in order to cause



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1 the breakdown. I don't understand what you're trying to
2 get at, but generally speaking, somethings got to come
3 along and transform that into something else; the
4 bacteria, there has to be plant uptake, there has to be
5 something.

6 Q Let's go back to the surface.

7 A Okay. I'll need another flip chart.

8 Q Why don't you go back to your original flip
9 chart, because I think that best illustrates the
10 question?

11 The studies you've done --

12 A -- surface like this one right here.

13 (Laughter.)

14 BY MR. MURRAY:

15 Q The studies you've done have to do either with
16 till or no till farming.

17 A Both. They are comparing a continuous corn
18 production system, one conventional till and one no
19 till.

20 Q You say "continuous." You don't mean year
21 round?



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1 A Year after year.

2 Q Year after year.

3 A The same acre grown with the same crop.

4 Q What do you do with that field during the non-
5 corn growing season?

6 A The stalks are chopped. Well, we've got a new
7 study going on now because of what we've learned, but
8 historically, the stalks are chopped and it's laid to
9 -- it's just laid to rest. Just, you know, with a
10 cover. Both convention and no till, that's the way
11 that's handled.

12 Q When you say "cover," what do you mean?

13 A This corn stover.

14 Q It's not replanted with a new crop?

15 A No. No.

16 Q Now, in your model, using the inches of water
17 -- is that what that is, inches of water?

18 A Yes. About -- yes. Inches of rain.

19 Q You indicated that both with the till and the
20 no till method, you end up showing 15 or 20 inches
21 getting into the ground.



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1 A (Nods head affirmatively.)

2 Q If you look at turf, and I know you haven't,
3 but you are at least willing, conceptually, I think, to
4 consider some of the obvious --

5 A Sure.

6 Q -- implications of turf.

7 A (Nods head affirmatively.)

8 Q If on the one hand, from what I understand you
9 to be saying, reduced surface water run-off to nil,
10 except in extraordinary rain events --

11 A That appears so, based on the gentleman at
12 Penn State, the study that was done that I got a copy of
13 recently. Scott Harrison.

14 Q Now --

15 A That's not me. That's my reading this.

16 Q Now, you go on to say, as I understand it,
17 that since it doesn't run off, it must go somewhere
18 else?

19 A Right.

20 Q And that somewhere else, in your view, is down
21 to the groundwater?



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1 A I say on turf -- here's what I'm trying to
2 say. As you reduce the amount that runs off, then the
3 only other place for that to go is in the soil profile.
4 It may end up in groundwater. It may not. But it has
5 to get below -- I mean, it becomes a part of this little
6 matrix. Depending on moisture conditions, it's final
7 fate will be a function of those moisture conditions,
8 antecedent moisture conditions at the time of the
9 rainfall event.

10 Q Okay.

11 A And if you are below field capacity and you
12 haven't irrigated, then you're probably not going to get
13 it flushing out.

14 Q In those events, that is when you're not -- in
15 your example, your sponge isn't full of water, so to
16 speak --

17 A Right.

18 Q -- then the water will tend to stay up in the
19 root zone.

20 A Definitely.

21 Q Taken up by the plants.



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A Yes.

Q Transformation. That sort of stuff.

A Right.

Q So --

A See, that's the whole reason that we encourage farmers to go no till. You reduce surface water run-off. You increase the amount of water that gets in the root zone. You've got a sponge that's not full, so you've got more moisture available to take the nutrients up, so you get increased yield.

Q Win/win.

A Right.

Q It doesn't get in the groundwater. It gets in the plants --

A That's right.

Q -- and it does what it's supposed to do.

A Exactly.

Q Now, just looking at your numbers, it says "Forty inches a year, less ten for run-off." Then you say "Fifteen to 20 to ENT, leaving 15 to 20."

A Yes. Well, that doesn't quite add up, of



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1 course.

2 Q It looks to me like it adds up to 10 to 15.

3 Right?

4 A Yes. It depends. Different years -- I mean,
5 some number, whatever. It varies year in and year out.
6 Some times we get a lot more run-off and sometimes we
7 don't.

8 But on an average, we figure, you know,
9 approximately half, a little less, of the total rainfall
10 infiltrates in the soil.

11 Q On the till and no till fields?

12 A Yes. And the way it really distributes itself
13 out, the only advantage the no till field has, in the
14 whole cycle of events with surface water run-off, is
15 early in the growing season.

16 Once you harvest your stalks in the fall, and
17 chop the stalks, the systems respond approximately the
18 same.

19 So, in the non-growing season, no till doesn't
20 do very much for us. In the growing season, it does.

21 Q The grasses in turf, do you know enough about



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1 them to comment as to whether or not they have a growing
2 season identically equivalent to the growing season for
3 corn?

4 A Oh, they'd be longer.

5 Q So --

6 A I mean, my guess is. I mean, golf courses are
7 nice, and pretty, and green in October and November.
8 So, yes.

9 Q So to that extent, wouldn't they also tend to
10 take up more of your excess water, just by virtue of
11 their being there, rather than bare ground?

12 A Absolutely. Yes. That's going to change the
13 cycle to death. No doubt about it. That is offset by
14 the extent to which you keep the sponge almost full
15 through irrigation.

16 Q Now, why would --

17 A If you don't do that, then you really gain.

18 Q Now, is there any reason in your mind why a
19 golf course manager would not seek to only irrigate when
20 it was needed?

21 A I have no idea about why, how they schedule,



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1 or whatever. If they schedule it appropriately, and
2 they use the latest technology, including tensiometers
3 and some other things, then they can schedule the
4 irrigation to do as good a job as a farmer would that's
5 got irrigation growing corn. If he used the appropriate
6 technology, he can -- he can't eliminate the risk,
7 because a farmer can never eliminate the risk with
8 irrigation because of weather.

9 Q Right.

10 A But if he does a good job, he can certainly
11 lower the risk, than by simply irrigating every third
12 day, or whatever he felt like.

13 Q Sure.

14 A So, any kind of an installation of a system
15 that would monitor soil moisture relationships and
16 irrigate -- schedule irrigation relative to that, it would
17 definitely be a step in the right direction. And that
18 may be proposed. I don't know. I didn't see that.

19 Q Did you read the part of the submittals that
20 had to do with the best management practices and an
21 integrated pest management program?



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1 A Yes. I read -- not in detail, but I did
2 notice that there was an IPM program. I noticed about
3 the fertilizer application, when you're going to do it,
4 and those kinds of things. Yes.

5 Q And those are, to borrow a word you used,
6 dynamic concepts, dependent upon conditions?

7 A Right.

8 Q Not predetermined months in advance?

9 A No.

10 MR. MURRAY: Thank you. No other questions.

11 MR. MURPHY: One question, Dr. Brinsfield.

12 REDIRECT EXAMINATION

13 BY MR. MURPHY:

14 Q You said that by careful irrigation, it would
15 reduce the risk.

16 A (Nods head affirmatively.)

17 Q Would you still have -- would the basic
18 principle still be there of the water going down to the
19 soil column, into the groundwater? Is that going to
20 have to take place?

21 A That would take place eventually because of



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1 the way the systems are in the Coastal Plains soils.
2 Somewhere along the line, you're going to get water
3 moving through the soil profile and becoming a part of
4 the system.

5 Now, the thing that I noticed in the studies,
6 and it could have been that they were designed that way
7 to get leaching, but the -- but if they were mimicking
8 the real world, they would treat and then irrigate,
9 treat and then irrigate.

10 And what happened was, the times that they
11 treated and irrigated, and then within 24 hours had
12 rainfall, that's when we got into problems. Okay?
13 Because, you know, they put the fertilizer on, or the
14 pesticide on. They wanted to get it mixed, and then we
15 had rainfall after that, and that's when we had the
16 problem of things leaching out.

17 Q So you are going to have a situation of
18 nitrogen going down into the groundwater from the
19 surface?

20 A Eventually, it's going to happen. It happens
21 in all systems, in Coastal Plains soils. Every year we



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1 get groundwater recharge. There has not been a year
2 yet, and I hope the Lord we never see one.

3 And so, whatever is in the soil profile that's
4 not been taken up by the plant, nitrate is going to move
5 down and become a part of the groundwater system.

6 MR. MURPHY: Thank you.

7 CHAIRMAN CORKRAN: Dr. Brinsfield?

8 THE WITNESS: Yes?

9 CHAIRMAN CORKRAN: Mr. Griffin has a question.

10 EXAMINATION BY THE COMMISSION

11 BY MR. GRIFFIN:

12 Q I can't recall, but what flexibility, to your
13 knowledge, exists in commencing a development activity,
14 whether it's residential homes, or as proposed here, a
15 golf course, in terms of dealing with stormwater run-
16 off, other than to capture it, and try to infiltrate it
17 through soil? I mean, is there any other option
18 available --

19 A The only other option --

20 Q -- in the current state of the law?

21 A Right. No. The only other option that is



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1 interesting, although it's not stated in the law, is
2 have -- the only other thing you can do is have large
3 evaporation ponds.

4 I mean, there are situations where you design
5 a pond to capture the run-off from a large area, with a
6 lot of surface area, very shallow, to where that "E"
7 number really kicks in and it will evaporate out.

8 But, unfortunately, most people who have ponds
9 want them to look nice year round, so they want them
10 full of water. And so, that's the dichotomy we've got
11 here, the balance between what's good for the
12 environment and what is acceptable by the golfers and --

13 Q Aesthetically pleasing.

14 A -- aesthetically pleasing and whatever. And
15 they kind of counter each other really.

16 But you can design large enough systems that
17 can collect surface water run-off and put a liner in the
18 bottom of the pond, so the only direction is up.

19 We have some ponds like that down at Wye that
20 we play with, but I must admit, when they get down low,
21 and you get grass growing around them, they become



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1 unsightly. So, they probably aren't very -- they're not
2 something somebody building a golf course would be too
3 interested in doing, I think.

4 The whole issue is, you've got -- what
5 everyone needs to remember is, just because you stop the
6 water from going in one direction, don't assume that you
7 have enhanced the water quality. You may or you may not
8 have, but you can't assume that. And that's one of the
9 problems we have generally with filter strips. Filter
10 strips are very nice. They do a good job of controlling
11 sediment, but they don't do anything for us in
12 controlling nitrogen. Because all you do is, stop it
13 from running off and then filtrating down. And unless
14 you capture it by a plant, it becomes a part of the
15 groundwater system, and then gets in the Bay, just
16 through another flood path. Thank you.

17 CHAIRMAN CORKRAN: Doctor.

18 MR. DEMING: I just have a question for
19 counsel.

20 CHAIRMAN CORKRAN: Oh, excuse me.

21 MR. DEMING: I don't think we need these



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1 drawings as --

2 (Laughter.)

3 MR. DEMING: -- if you don't object, we'll
4 throw them away. No offense, Doctor.

5 CHAIRMAN CORKRAN: Thank you, very much.

6 THE WITNESS: You're welcome.

7 MR. MURPHY: Dr. Jacobs.

8 Whereupon,

9 FRED JACOBS,
10 a witness, called for examination by counsel for the
11 Citizens for Preservation of Queenstown Creek, was duly
12 sworn, and was examined and testified as follows:

13 DIRECT EXAMINATION

14 BY MR. MURPHY:

15 Q Dr. Jacobs, what is your occupation?

16 A I am President of Coastal Environmental
17 Services. Approximately a 30 person environmental
18 consulting firm.

19 Q And what is your education?

20 A I have -- my highest degree is a PH.D. in
21 marine biology from the University of Virginia.



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1 Q And have you studied the development plans and
2 the environmental assessment, and the stormwater impact
3 study, and the best management plan for the proposed
4 Queenstown Golf Course?

5 A Yes, I have. I have also prepared a report on
6 -- characterizing the water quality of Queenstown Creek.

7 Q And the report you are mentioning, this was
8 prepared in 1988, and was an investigation of the -- an
9 analysis of the data on Queenstown Creek?

10 A Correct. Existing data that had existed and I
11 tried to put together some commentary on the status of
12 the water body.

13 Q Where was this data derived from?

14 A It was derived from a number of sources.
15 There had been some citizens groups that had done some
16 work. Anchors American had done some work.

17 I generally discounted the significance of
18 those studies because I just couldn't really approve or
19 verify the methodology that was used. But some of the
20 later studies, conducted by the State of Maryland,
21 Department of the Environment, and Department of Natural



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1 Resources, appeared to be well designed and fairly
2 rigorous studies from a scientific perspective.

3 MR. MURPHY: I would offer Dr. Jacobs as an
4 expert witness.

5 CHAIRMAN CORKRAN: All right. Mr. Murray?

6 MR. MURRAY: Can you narrow it down on what?

7 MR. MURPHY: On water quality.

8 MR. MURRAY: Generally?

9 THE WITNESS: Would you like me to be more
10 specific?

11 MR. MURPHY: Wait a minute.

12 MR. MURRAY: Are we talking about Queenstown
13 Creek only.

14 THE WITNESS: -- some of the things that I've
15 done.

16 MR. MURPHY: Yes. Queenstown Creek --

17 MR. MURRAY: No problem.

18 MR. MURPHY: -- and perhaps the Chester River.

19 MR. MURRAY: Nor that.

20 CHAIRMAN CORKRAN: Okay. Thank you. Proceed.

21 BY MR. MURPHY:



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1 Q Okay. Dr. Jacobs, is this the report you
2 prepared?

3 A Yes, it is.

4 Q Do you have copies of that with you?

5 A Yes, I do.

6 MR. MURPHY: I would offer these.

7 CHAIRMAN CORKRAN: Mr. Murray, have you seen
8 these?

9 MR. MURRAY: No, I have not. Do these have
10 all the same thing --

11 MR. MURPHY: Yes.

12 CHAIRMAN CORKRAN: We'll give you a chance to
13 review the report.

14 MR. MURRAY: Having just glanced at the report
15 for the first time, it appears to have been prepared to
16 comment on a proposed, as it states, hotel/marina/golf
17 course complex. That's clearly not what this proceeding
18 is about. I flipped through the pages and virtually
19 every page in there has to do with marinas and hotels.
20 I, again, fail to see how that kind of data or
21 investigation has anything to do with the project that



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1 is before this panel today. So, for that reason I
2 object to the introduction of this document, or
3 testimony about those kinds of things.

4 CHAIRMAN CORKRAN: We noted that as well. Let
5 me, if I may, ask a question. What page, in order to
6 facilitate this, or pages, do you refer to water
7 quality, with just golf courses?

8 THE WITNESS: What I would like to introduce
9 here is applicable, in the sense that what I'm trying to
10 do is state -- is paint a picture of the water quality
11 of Queenstown Creek.

12 I agree that this report was prepared with the
13 marina/golf course complex in mind. But, the bulk of
14 the report is a characterization, devoted to a
15 characterization of Queenstown Creek, based upon the
16 existing water quality of Queenstown Creek. And that's
17 what I would like to pull out of this report. And those
18 are on pages -- there is a whole chapter on just water
19 quality in this report.

20 CHAIRMAN CORKRAN: So, noting the objection,
21 let's admit this, but restricting it, if you would, to



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1 those sections that pertain to the water quality of
2 Queenstown Creek, as it apparently stood sometime in
3 1988. And I believe those pages are Section four. Is
4 that correct, Dr. Jacobs?

5 THE WITNESS: Yes, sir.

6 CHAIRMAN CORKRAN: The --

7 THE WITNESS: And the living resources, which
8 is in the next section, which has to do with biological
9 resources.

10 MR. MURRAY: Section five. Those four pages
11 in Section four and Section five.

12 MR. MURPHY: Mr. Chairman, I object to any
13 restriction placed on this report. Now, I'm not saying
14 that there's a regatta -- a marina proposed here. But,
15 it's a possibility, and so is -- are houses, and so is a
16 wide range of possible uses.

17 CHAIRMAN CORKRAN: Mr. Murphy, I can guarantee
18 you that this panel, nor this Commission, is going to
19 consider the hotel, or a marina on this property.

20 MR. MURPHY: Thank you, Mr. Chairman. I
21 appreciate that guidance.



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1 CHAIRMAN CORKRAN: This is what this hearing
2 is about, isn't it? About a golf course. Not about a
3 marina. Not about a hotel. Isn't that true?

4 MR. MURPHY: There is no restriction proposed
5 by the Applicant.

6 CHAIRMAN CORKRAN: Well, that certainly is not
7 my understanding.

8 MR. MURPHY: There is no restriction proposed
9 by the Applicant. There is no covenants, no restrictive
10 deeds that have been proposed.

11 CHAIRMAN CORKRAN: I didn't say there were
12 restrictive deeds. What this hearing is about is a golf
13 course on this property. This is the presentation. I've
14 seen in no way, any place, where there has been proposed
15 to be a hotel, nor a marina.

16 MR. MURPHY: Well, Mr. Chairman, I accept your
17 guidance on that and I didn't mean to --

18 CHAIRMAN CORKRAN: So, we are going to accept
19 it with the provisions that it deals with water quality
20 only.

21 MR. MURPHY: I appreciate your guidance on



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1 that and I didn't mean to challenge that. The only
2 point I'd like to make and I'll just state this, is that
3 there has to be a procedure developed to impose
4 restrictions on this property, if we are simply going to
5 talk about a golf course, because we heard the planning
6 director testify that houses were allowed and you've
7 heard testimony that a hotel was proposed in the past.

8 My only point I'm wishing to make and I don't
9 mean to be argumentative about it at all, is is that
10 that is a possibility. And if we simply are talking
11 about the golf course, we have to know if it is going to
12 be restricted to a golf course.

13 And as I say, there is nothing -- there is no
14 part -- I can't restrict the golf course. It's not
15 within my power. The only person that can restrict that
16 is the Applicant. And there have been no covenants or
17 restrictions proposed by the Applicant to do that. And
18 I submit that's a serious point. It's one of --

19 CHAIRMAN CORKRAN: I think you made a point
20 earlier that perhaps the Commission has that right to
21 restrict use under the Critical Areas Law. Don't you



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1 think?

2 MR. MURPHY: Mr. Chairman --

3 CHAIRMAN CORKRAN: Or, didn't you?

4 MR. MURPHY: What I'm saying -- the point I
5 want to make is, is that there is no authority in your
6 criteria, your regulations, to impose restrictions on a
7 particular use.

8 CHAIRMAN CORKRAN: Let's --

9 MR. MURPHY: I'm not trying to be difficult,
10 but I'm saying that. And the point I'm trying to make
11 is, is that if restrictions are to be imposed, they have
12 to be imposed by some type of covenants that will insure
13 them.

14 CHAIRMAN CORKRAN: Let's proceed.

15 (Whereupon, the document was marked for
16 identification Citizens' Exhibit next in order, and
17 received in evidence.)

18 BY MR. MURPHY:

19 Q Dr. Jacobs, utilizing the information that the
20 Chairman alluded to in this report, could you describe
21 for us what you learned about the water quality of



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1 Queenstown Creek?

2 A Well, the first study that was conducted by
3 the Maryland Department of the Environment, was a dye
4 study in the summer of '87. And what they were really
5 looking at was dispersion and dilution characteristics
6 in the creek.

7 And what they concluded was that Queenstown
8 Creek was relatively poorly -- a relatively poorly
9 flushed system.

10 The dye study, where they injected dye over a
11 96 hour period, and then they stopped the dye and
12 watched how it was distributed or dispersed in the
13 creek, and after four days, there was still 20 to 25
14 percent of the original dye concentration in the creek.

15 So what was happening is, is the dye is going
16 out with the tide, but it's coming back in on the next
17 flood tide. And in addition, there was a build-up of
18 dye in Queenstown -- the dye was injected in Little
19 Queenstown Creek, and there was a build-up of dye in
20 Queenstown Creek proper.

21 So this was also confirmed by some



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1 calculations we made in my firm, using first principles,
2 not considering dye, just looking at tidal excursion
3 distances, tide heights, basin, and tidal movement. We
4 made some rough calculations and came up with a similar
5 conclusion, that the -- to the State's study, that the
6 system was not a very well flushed system.

7 So, what that implies is that if something
8 gets into Queenstown Creek, the Little Queenstown Creek
9 system, it's going to stay there. This was the basis --
10 this is the basis of all the concern.

11 If it was a well flushed system -- as they say
12 in graduate school, they teach you the solution to
13 pollution is dilution. But that's not the case here.
14 So, we've got a potential problem.

15 The other study which was done dealt more with
16 some water quality aspects and looked at dissolved
17 oxygen concentrations.

18 Now, on three occasions in the summer of 1987,
19 the dissolved oxygen concentrations that were taken
20 during the middle of the day exceeded the State's
21 standard of five parts per million. However, that is a



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1 part of the day when maximum photosynthesis is going on
2 by the algae and the -- plankton and you would expect
3 oxygen to be produced.

4 They did have diurnal monitors. In other
5 words, at a couple of stations, on a couple of
6 occasions, where the measurements were being made 24
7 hours a day. And on certain dates, the measurements did
8 fall below -- well below -- the five part per million
9 standard. So, we have a potential for dissolved oxygen
10 stress in that system as well.

11 Other measurements that were taken by other
12 researchers supported that, but again I don't put too
13 much weight on those other studies. But, it tends to
14 support that situation.

15 Now, the Maryland DNR -- when the sewage
16 treatment plant was considering an increase in its
17 capacity, the Maryland DNR expressed considerable
18 concern about the types of additional stress that
19 nutrient load would place on the Queenstown Creek
20 system.

21 And they concluded that -- there was a letter



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1 written to the Maryland Department of the Environment in
2 April, I believe -- April 1st, 1987, where they
3 summarized some of their own investigations and
4 concluded that the system was in -- had gone out there
5 and found alga blooms, periodic alga blooms, occurring
6 in the Queenstown Creek system, which is an indication
7 of nutrient enrichment, excessive nitrogen and
8 phosphorus.

9 So, I just think that the whole picture that's
10 being painted is one of a stressed water body, the
11 extent of which is unknown.

12 The Maryland Department of Natural Resources
13 suggested that before a sewage treatment plant would be
14 allowed to increase its capacity, a great deal of
15 additional study on the existing condition of the creek
16 should be done.

17 So, that's basically what the existing
18 condition of the creek is.

19 Q Did you review the various documents
20 associated with the golf course and reach any
21 determination as to whether there might be a



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1 relationship between the use of the golf course and the
2 existing condition of the creek?

3 A I found that the documents were as good as far
4 as they went, but they failed to adequately, in a
5 quantitative sense, put forth a reasonable assertion in
6 my mind that would -- that was scientifically
7 defensible to support the claims that were made.

8 Q Why do you say that?

9 A Well, the -- first of all, the existing
10 conditions of the creek have not -- of that system have
11 not been adequately described.

12 Second of all, there is no quantitative
13 exercise on how the change in land use, coupled with the
14 expected nutrient and sediment loadings, would -- how
15 that would change from the existing condition to the
16 golf course condition.

17 This is an exercise that I have seen done in
18 several environmental impact statements and I feel it
19 should be included in one such as this. And basically
20 what it is is the Environmental Protection Agency has
21 published a series of loading coefficients which



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1 estimate nutrient run-off, pesticide run-off,
2 phosphorus, nitrogen, as well as other things like
3 sediment loading, from different land use types. And
4 this is for surface water.

5 And then you can look -- you take those loads
6 and you run a relatively simple model and then you look
7 at the new condition and you compare what you had
8 before, in terms of loading entering the creek to what
9 is being proposed under the new condition.

10 And I also agree -- so that's for the surface
11 water. And for the groundwater, some type of
12 quantitative exercise, as Dr. Brinsfield alluded to, is
13 also required.

14 It's just my feeling and I've done several of
15 these environmental impact documents for developers. My
16 firm has done them for golf courses, and it is my view
17 that it is incumbent upon the developer, when he's
18 putting forth a project like this, to present
19 quantitative information to support his position.

20 I am not trying to imply that the statements
21 made in the documents are not true, regarding the



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1 potential impacts to the creek. I just say they are not
2 very well supported.

3 Q So, you're saying -- you're not saying that
4 there necessarily will be an adverse impact from the
5 golf course, right?

6 A I'm not saying that, but the -- you have a
7 situation where you're going to have a septic system,
8 which is going to introduce nutrients into the
9 sub-surface area, which will find its way into the
10 groundwater. So, where are those nutrients going to go?
11 The same question as Dr. Brinsfield alluded to, and in
12 what quantity.

13 Similarly, you're going to have the surface
14 water run-off and the -- and you're going to have
15 leaching material into the groundwater.

16 Now, I would like to see some exercise, some
17 modeling exercises, for both the surface water, the
18 groundwater, and perhaps the septic systems, to
19 determine how much of that would get back into the water
20 body.

21 Q Into Queenstown Creek?



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1 A Correct.

2 Q And also, do you feel there is an adequate
3 understanding of what is the existing stress condition
4 of Queenstown Creek?

5 A No, I don't. I think that the information is
6 spotty. It's like you've got some symptoms to suggest
7 that the creek is in poor shape. You have anecdotal
8 information from fishermen to indicate that, you know,
9 the crabs are down, and the fish are down, but you know,
10 this is not scientific information.

11 In fact, the DNR study specifically stated
12 that before any kind of activity -- they were referring
13 to a sewage treatment plant -- an increase -- but it
14 would apply to a potential activity that could increase
15 nutrient loading from any source be considered, that you
16 should conduct studies of the fishery resources of the
17 system. They alluded to the fact that the area could be
18 a nursery ground for yellow perch.

19 Does that answer your --

20 Q Yes. I'm just trying to -- so, if I asked you
21 what the -- whether you had a view as to the



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1 environmental impact of the golf course, you're saying
2 that really you need further studies to determine it?

3 A That would be my recommendation. Yes.

4 Q Do you agree with Dr. Brinsfield that you need
5 to study the groundwater to see which way it goes?

6 A Yes. I think you have to have -- you know,
7 you have to have some basis for making a decision. I
8 realize this costs money, you know, and you can spend a
9 lot of money doing it, but there has to be some
10 quantitative basis to make such decisions. At least
11 that's my view of it. And that's the way I --

12 Q Before you have this information, you really
13 don't have enough information to make a decision as to
14 whether there will be an adverse environmental effect or
15 a positive one, right?

16 A Exactly.

17 MR. MURPHY: That's all I have.

18 CHAIRMAN CORKRAN: Mr. Murray?

19 CROSS-EXAMINATION

20 BY MR. MURRAY:

21 Q Dr. Jacobs, looking through your report in the



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1 last five minutes, it looked to me like your data were
2 obtained in '87 --

3 A Correct.

4 Q -- and a report written in '88.

5 A Correct.

6 Q When was Queenstown Creek last dredged?

7 A I don't know.

8 Q Has it been dredged since '87?

9 A I don't know.

10 Q If it were, would that affect the water
11 quality, in all likelihood?

12 A If it had been dredged since '87, it's
13 possible that the flushing characteristics could be
14 improved.

15 Q With respect to the water quality -- let's
16 just assume for the moment that what was a problem in
17 '87, remains a problem to one degree or another, for the
18 purposes of this question.

19 You indicated that you've done work on golf
20 courses before.

21 A My firm has. I have not.



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1 Q Isn't it entirely possible that such work
2 would show that the golf course activity would be less
3 of a water quality problem than the current agricultural
4 use?

5 A It's possible.

6 Q From what you know, does it appear that the
7 sewage treatment plant, which discharges into Queenstown
8 Creek is the single largest problem, from a water
9 quality point of view?

10 A I would concur with that opinion.

11 Q Can you quantify -- are you capable of
12 quantifying, by comparing the degree of magnitude, of
13 what you would guess to be -- or guesstimate to be --
14 the contribution to the problem made by the sewage
15 treatment plant versus, for example, My Lord's Gift
16 Farm?

17 A I would have to run through the exercise. I
18 wouldn't want to speculate. That is basically the
19 exercise we did on the marina, which we don't want to
20 talk about.

21 CHAIRMAN CORKRAN: It's not an issue.



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1 THE WITNESS: But I would suggest that that
2 issue -- that that exercise be done. It can be done,
3 given the available tools of the trade, and I would
4 recommend that that be done.

5 BY MR. MURRAY:

6 Q Is it not possible that the relative degree of
7 magnitude, the farm versus the sewage treatment plant,
8 is very small?

9 A It's possible.

10 Q And if the EPA type studies and models were
11 done, do you think -- and if they supported the
12 proposition that it would be better from a water quality
13 point of view, that that would be sufficient basis to
14 proceed?

15 A I don't think I'm the person to make that
16 decision, but I would like to see that. I think it
17 would support your position.

18 Q I don't mean on a project approval basis. I
19 mean on narrowing looking at it from a water quality
20 point of view. If you did those studies --

21 A Yes. I think what you could do is, you could



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1 do a number of things. And, in fact, we do these things
2 as a company -- we're doing a job like this for the City
3 of Salisbury right now. You can optimize your best plan
4 for reducing nutrient inputs into the system. So, you
5 look at a before condition and then perhaps one or even
6 more after conditions, given these land use models.

7 Now, these land use models are criticized for
8 not being, you know, entirely accurate and this and
9 that, and there are limitations. But they are at least
10 in some sense, in a relative sense, accepted and have
11 been used in environmental impact statements and in lake
12 management studies and lake restoration studies.

13 Q They are reasonably accurate enough to rely on
14 them?

15 A Right.

16 MR. MURRAY: That's all the questions I have.

17 MR. GRIFFIN: I have one.

18 CHAIRMAN CORKRAN: Yes, sir.

19 EXAMINATION BY THE COMMISSION

20 BY MR. GRIFFIN:

21 Q In your experience, what amount of time would



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1 it normally take to collect the data and analyze it for
2 the sort of study that you're suggesting be done -- is
3 there any norm?

4 A Well --

5 Q -- the protocol involved.

6 A It would probably not take very long. Two or
7 three months, I would say, if you worked at it -- I say
8 that only because there is some water quality data on
9 the creeks. That is for the surface. Now I'm not --
10 the groundwater stuff is going to be a bit more
11 complicated. Quite a bit more complicated. And I'm not
12 the right person to answer that question. Perhaps
13 that's what Dr. Brinsfield was suggesting.

14 But, I have seen them done in these type
15 documents.

16 MR. GRIFFIN: Okay. Thank you.

17 REDIRECT EXAMINATION

18 BY MR. MURPHY:

19 Q Did you ever prepare a report summarizing your
20 testimony today?

21 A Yes. You have copies of that.



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1 MR. MURRAY: Borrowing a term which I had used
2 a minute ago in another context, it appears to me that
3 the report dredges up the marina/inn discussion earlier
4 in its conclusions, with the exception then of the last
5 two sentences -- last three sentences of the report, I
6 have no objection. The last three sentences again raise
7 the spectrum of all the other things in the world that
8 can happen, but which are not part of this project.

9 CHAIRMAN CORKRAN: We'll note your objection.

10 MR. MURRAY: Thank you.

11 MR. MURPHY: I'd offer this. Thank you, Dr.
12 Jacobs.

13 (Whereupon, the document was marked for
14 identification Citizen's Exhibit next in order, and
15 received in evidence.)

16 MR. MURPHY: Mr. Donald Horney.
17 Whereupon,

18 DONALD HORNEY,
19 a witness, called for examination by counsel for the
20 Citizens for Preservation of Queenstown Creek, was duly
21 sworn, and was examined and testified as follows:



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DIRECT EXAMINATION

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BY MR. MURPHY:

Q Would you state your full name, Mr. Horney?

A Donald Horney.

Q Mr. Horney, where do you live?

A I live in the town of Queenstown.

Q And what is your occupation?

A I'm a commercial waterman.

MR. MURPHY: I would offer Mr. Horney as a
waterman.

CHAIRMAN CORKRAN: Do you have any objection.

MR. MURRAY: Mr. Horney, how long have you
been a waterman?

THE WITNESS: About 25 years.

MR. MURRAY: Accepted.

BY MR. MURPHY:

Q Mr. Horney, how would you describe Queenstown
Creek?

A Well, it's beginning to look like a freshwater
stagnant pond.

Q Why do you say that?



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1 A Well, if you go down late in the evening on a
2 warm day, and you'll see all the algae floating to the
3 top of the water and covering the surface, just like a
4 freshwater pond. If it gets much worse, I think you're
5 going to start seeing lilies on it.

6 Q Do you associate that with a decline in the
7 water quality?

8 A With a decline in the water quality and the
9 amount of freshwater coming in and staying in the creek.

10 Q And you heard the testimony about the
11 flushing. That's your understanding also that it
12 flushes poorly?

13 A It flushes poorly. It's almost fresh. I
14 don't see how, you know, that all the algae and stuff on
15 the surface of the water -- in hot weather you don't see
16 other places -- before the sewage systems and all that
17 stuff has come into effect. This project looks like to
18 me it's just going to be putting more in.

19 Q Now, Mr. Horney, going out of the creek into
20 the Chester River, are there clam beds out there?

21 A Clam beds come into the mouth of the creek.



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1 Q How extensive are the clam beds?

2 A Very extensive. You mean just out front, or
3 in --

4 Q Up and down the Chester --

5 A The whole river.

6 Q Is it a rich clam area?

7 A Very rich. Probably in the last five years, I
8 would estimate maybe eight percent of the clams coming
9 out of the state of Maryland is coming out of the
10 Chester River and the bay front of the Chester River --

11 Q Why is that? Because the conditions have
12 deteriorated elsewhere in the Bay?

13 A Conditions have deteriorated.

14 Q So clammers come from all over to clam there?

15 A From the entire state. I'd say just about all
16 of them are concentrated right here right now to make a
17 living.

18 Q And do you have a concern about the Queenstown
19 Golf Course with respect to the clam beds?

20 A Yes, I do. It is situated, as far as I am
21 concerned, in a critical area. We're as far up the



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1 Chester River as we can go. It is maybe four miles
2 above the mouth of the Crosica River -- right on out on
3 the bay shore. Queenstown is just about the middle
4 point of the grounds that we can work where clams live.
5 It's about a central point of it. And I'm afraid if
6 something happens there, it's going to be detrimental to
7 the clam and oyster beds in both directions from
8 Queenstown, up the river and down the river.

9 MR. MURPHY: Thank you. That's all I have.

10 CHAIRMAN CORKRAN: Just a minute. Mr. Murray?

11 CROSS-EXAMINATION

12 BY MR. MURRAY:

13 Q Mr. Horney, the concern you have about
14 freshwater in the creek, where do you think all of that
15 freshwater is coming from?

16 A Well, you know how nature is, and we have
17 rain, a natural rainfall, and the environment -- the
18 clams, the oysters, and everything -- the salinity of
19 the water is determined by the environment. And every
20 time you keep adding sewer systems, or any other type of
21 system that is going to put more freshwater into the



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1 system, there becomes a limit, and it's coming from
2 everywhere. And everybody knows it. All the towns --
3 everywhere is being developed, and there's more and more
4 freshwater being developed -- land being cleared for
5 run-off from every place.

6 Q So, insofar as you are concerned about the
7 golf course project, it sounds as if you are supposing
8 that it will result in additional freshwater in the
9 tidal water?

10 A Absolutely.

11 Q Are you aware that my clients sought to have
12 the Town of Queenstown send its effluent over to the
13 farm, to be spray irrigated?

14 A I think it's a very good idea and I'd still
15 like to see that.

16 Q But you don't want to see a golf course?

17 A Well, maybe as a tradeoff, but no, I don't
18 want to see the golf course. The golf course, as far as
19 I'm concerned, is a concern, but the influx of people
20 and the activity is as much a concern as the golf
21 course. In fact, probably more so on pollution.



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1 Q Golfers are going to hurt the clams then?

2 A Right. In a roundabout way, with sewage,
3 trash. Any time you get a heavy influx of people, it's
4 going to hurt.

5 MR. MURRAY: No other questions. Thank you,
6 Mr. Horney.

7 CHAIRMAN CORKRAN: Thank you.

8 REDIRECT EXAMINATION

9 BY MR. MURPHY:

10 Q Mr. Horney, in response to the question about
11 the water, are you aware that golf courses are irrigated
12 and draw up the water from the underground aquifer?

13 A Yes.

14 Q So, is that part of your calculation in
15 thinking that there is going to be more freshwater on
16 the site?

17 A Absolutely.

18 MR. MURPHY: That's all I have.

19 THE WITNESS: Any time you bring more water --
20 putting it out, there's more water there.

21 CHAIRMAN CORKRAN: All right. Thank you, Mr.



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1 Horney.

2 THE WITNESS: Okay.

3 MR. MURPHY: Mr. Klein.

4 Whereupon,

5 RICHARD KLEIN,

6 a witness, called for examination by counsel for the
7 Citizens for Preservation of Queenstown Creek, was duly
8 sworn, and was examined and testified as follows:

9 DIRECT EXAMINATION

10 BY MR. MURPHY:

11 Q Mr. Klein, would you tell the members of the
12 Commission what has been your professional experience?

13 A Well, from 1969 to 1988, I served as a manager
14 with the Maryland Department of Natural Resources, the
15 first four years managing surveys of fishery resources
16 in Maryland. The second four years, from 1973 to 1977,
17 I served with the Water Resources Administration, Water
18 Quality Services Monitoring Group, in which I managed
19 studies of water quality, both physical, chemical, and
20 biological character of both freshwater and estuarine
21 systems.



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1 From '78 up till '88, I served as the
2 Executive Director of Save Our Streams for the Maryland
3 Department of Natural Resources.

4 Q And have you published papers in the field of
5 water quality and urban development?

6 A Yes, I have. In 1979, I published a paper in
7 the Water Resources Bulletin entitled "Urbanization and
8 Stream Quality Impairment."

9 Q And have you published any studies dealing
10 with the effect of golf courses on water quality?

11 A Yes. In 1989, I published a study entitled
12 "The Relationship Between Stream Quality and Golf
13 Courses."

14 Q And, finally, did you publish a study directed
15 at how golf courses may be constructed to avoid water
16 quality problems?

17 A Yes. I recently published a 65 page
18 publication entitled "Protecting the Aquatic Environment
19 from the Effects of Golf Courses."

20 The intent of that publication is to
21 demonstrate how you can cite and design a proposed golf



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1 course to minimize potential effects upon aquatic
2 resources, and to evaluate an existing golf course to
3 look for opportunities to enhance water quality, as it
4 relates to that golf course.

5 Q Do you have copies of these studies here?

6 A Yes. That's the golf course study.

7 Urbanization study.

8 MR. MURPHY: I would offer Mr. Klein as an
9 expert witness in the field of water quality.

10 CHAIRMAN CORKRAN: Mr. Murray, do you have --

11 MR. MURRAY: Accepted.

12 CHAIRMAN CORKRAN: Accepted?

13 MR. MURRAY: Yes.

14 MR. MURPHY: And I would offer these documents
15 for introduction into evidence.

16 The first is the study of Mr. Klein's entitled
17 "Urbanization and Stream Water Quality," published in
18 the Water Resources Bulletin.

19 The second is entitled "The Relationship
20 Between Stream Quality and Golf Courses."

21 And the third is "Protecting the Aquatic



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1 Environment from the Effects of Golf Courses."

2 Have they been introduced?

3 CHAIRMAN CORKRAN: Mr. Murray, do you have any
4 objection?

5 MR. MURRAY: No, sir.

6 CHAIRMAN CORKRAN: No? They are introduced.

7 (Whereupon, the documents were marked for
8 identification Citizens' Exhibit Numbers next in order,
9 and received in evidence.)

10 BY MR. MURPHY:

11 Q Mr. Klein, turning your attention to the first
12 study you did, the relationship between stream quality
13 and golf courses, would you very briefly summarize how
14 you went about that study and what the results of the
15 study were?

16 A Yes. I was trying to determine how a proposed
17 golf course might affect a high quality aquatic
18 resource, such as a trout stream.

19 The first thing I did was to review the
20 scientific literature to find out what was known about
21 the relationship between golf courses, or turf



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1 management in general, and the effects upon aquatic
2 resources.

3 What I found as a result of that review of the
4 scientific literature was that the only information that
5 was available was some spotty information on the --
6 fertilizers and pesticides from managed turf.

7 Insufficient information was available at that
8 time to make any firm conclusions about how a proposed
9 golf course might affect a high quality aquatic resource
10 again.

11 So what I did was to design my own study,
12 following the same basic procedures that I had used in a
13 1979 study, updating them to incorporate some
14 improvements that had been offered by the Environmental
15 Protection Agency. What I did was to study the effects
16 of 11 existing golf courses upon the aquatic resources
17 that were associated with those 11 golf courses.

18 Specifically, I looked at the organisms
19 growing within the waterways associated with those golf
20 courses to find out whether or not they evidenced any
21 indication of adverse impact as a result of the golf



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1 courses.

2 In all honesty, when I first designed the
3 study, what I expected to find was impact about on the
4 same order or magnitude as you might associate with a
5 pasture. In other words, very mild impact. I didn't
6 expect to find anywhere near the extent of impact that I
7 actually did find after looking at those 11 waterways.

8 What I found was that there is a general
9 relationship between the quality of a waterway and the
10 amount of land in the watershed of that waterway that's
11 in use as a golf course. As the percent of watershed
12 and golf course increases, the quality of the waterway
13 declines.

14 Generally, when the amount of watershed area
15 in golf course exceeds 50 percent, the waterway will be
16 in a severe to moderately degraded condition. In other
17 words, that waterway will be incapable of supporting a
18 very sensitive aquatic resource. It will be unfit for
19 most human uses.

20 The extent of degradation, the extent of
21 impact will be such that the waterway will have



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1 relatively few of the uses that people normally
2 associate with the high quality aquatic resource.

3 From there, I went back to the literature to
4 try to get a better feeling of exactly what it was about
5 a golf course that might be having such a severe impact
6 upon aquatic resources, since again the level of
7 degradation surprised me quite a bit.

8 What I also did was to take the results of my
9 study of these 11 golf courses and relate it to the
10 results from my 1979 study.

11 In my 1979 study, I looked at samples
12 collected from more than 100 aquatic systems draining
13 areas that ranged anywhere from being very lightly
14 developed to very intensely developed. Developed in
15 terms of residential, commercial, industrial activity,
16 the vast majority of it being residential.

17 What I found was that the extent of impact,
18 the extent of degradation which I found for those
19 waterways that drain -- watersheds that were primarily
20 golf course in nature, or golf course dominated
21 watershed land use, that the extent of impact that is



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1 evidenced in those waterways was about the same, based
2 upon my 1979 study as you would expect in a watershed
3 that's been rendered 25 percent impervious. In other
4 words, 25 percent of that watershed is covered by
5 asphalt, concrete, or roads, buildings. That equals a
6 land use of about one home for every half acre.

7 In other words, if you equate the condition,
8 the lack of health in waterways associated with golf
9 courses with urbanization, what you find is that the
10 golf course waterway equals something that you would
11 expect again in a fairly intensely developed watershed,
12 developed for residential purposes.

13 I also did a comparison between the quality of
14 waterways in that same region, that drained primarily
15 agricultural land, and the quality of the waterways that
16 drained primarily the golf courses. What I found was
17 that the waterways that drained primarily agricultural
18 regions generally exhibit slight to moderate
19 degradation. The waterways that drain golf courses,
20 again, or were golf course dominated watershed land use,
21 were more degraded. Generally they fell in the range of



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1 moderate to severely degraded.

2 So, again, what I found, comparing the results
3 of my study with the results that I published in my 1979
4 study, plus other studies that I've done in that same
5 area, I found that the effect of the watershed that is
6 dominated by a golf course is more severe than the
7 impact of a watershed that's dominated by farming. It
8 again equates to a fairly intense residential
9 development.

10 Q Now, did I furnish you with copies of the
11 plans and the environmental assessment, and the
12 stormwater management study, and the best management
13 study, for the Queenstown course?

14 A The Queenstown Harbour Golf Links, yes.

15 Q And did you review those documents?

16 A Yes, I did.

17 Q And would you briefly tell the Commission what
18 your observations are, based on review of those
19 documents?

20 A Well, the effects of a golf course upon the
21 aquatic systems that are associated with the Queenstown



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1 site, one of the most significant factors, in terms of
2 this particular site, is that the best soils data that
3 is available right now, which is the Queen Anne's County
4 Soil Survey, according to that Queen Anne's County Soil
5 Survey, the soil conditions on the Queenstown Harbour
6 Golf Links site would favor a fairly significant amount
7 of impact upon the aquatic resources that are associated
8 with it.

9 The reason why I say that is that according to
10 that soil survey, a large number of the proposed
11 fairways, greens, and tees on the Queenstown Harbour
12 Golf Course are located on soils that are either sandy
13 in nature, coarse texture, with relatively low capacity
14 to attenuate nitrogen and nitrogen compounds and
15 pesticides -- leaching down into the soil column, or the
16 water table occurs quite close to the surface.

17 Both of those conditions, from the literature
18 review that I conducted, are the same ones that have
19 been associated with high leaching rates for nitrate and
20 pesticides for managed turf, for well managed turf.

21 Q If you would just bear with me for a minute, I



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1 have a copy. Do you have a copy of the soil analysis
2 that you did?

3 A Yes.

4 Q Here. This is it. Here is a copy of the soil
5 survey. And then is this the analysis you did?

6 A Yes. Here are three copies.

7 Q The first document in here is actually just
8 the Queen Anne's County -- an excerpt from the Queen
9 Anne's County -- I'm sorry. This is --

10 A The first page is just a Xerox of the cover --

11 Q The cover sheet of the soil survey. But, what
12 did you do? You took the information from the Queen
13 Anne's County Soil Survey and mapped it out according to
14 the -- according to the holes, right?

15 A Yes.

16 Q So, hole 1A, and 2A. You have all the holes
17 listed.

18 A (Nods head affirmatively.)

19 Q And that includes the fairways, greens, and
20 tees?

21 A What I did was to take the plans that were



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1 submitted by the Applicant, those that you obtained from
2 the Critical Areas Commission that showed the soils on
3 the site, and another plan that showed the proposed
4 layout of the fairways, greens, and tees, made an
5 overlay of the two so I could determine what soils,
6 according to that soil overlay, occurred within each
7 fairway, green, and tee that was proposed on the plan.
8 And then went back to the Queen Anne's County Soil
9 Survey and looked up in the tables that are provided in
10 that publication what USDA texture classification is
11 applied to each one of those soils, within each one of
12 those fairways, greens, and tees, and what the elevation
13 was to the seasonally high water table.

14 MR. MURPHY: I would offer this in evidence.

15 CHAIRMAN CORKRAN: Mr. Murray, do you have --

16 MR. MURRAY: Except to -- insofar as Mr.
17 Klein's report here is merely a compilation of public
18 data, I have no objection to it. But, insofar as it
19 appears to be analytical, or contain conclusions of his
20 own, it seems to me it at least suggests that he's going
21 beyond the scope of what he's been admitted as an expert



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1 for, which was water quality, not soils. He may well be
2 an expert on soil characteristics and so on, but we
3 didn't admit him as an expert for that purpose.

4 MR. MURPHY: I think an expert on water
5 quality has to know how the water goes through the
6 soils. And I think that's a fine distinction. I'll
7 qualify him as an expert in soils. He had to study the
8 soils to do these reports.

9 CHAIRMAN CORKRAN: Why don't we just note the
10 objection -- admitted.

11 MR. MURRAY: Fine.

12 MR. MURPHY: Here are three copies.

13 (Whereupon, the document was marked for
14 identification Citizens' Exhibit Number next in order,
15 and received in evidence.)

16 BY MR. MURPHY:

17 Q Now, Mr. Klein, that report -- what in general
18 does it indicate about the soil types on the site,
19 insofar as their relationship to water quality?

20 A Well, what I found was that 37 percent of the
21 proposed holes -- 37 percent of the proposed fairways,



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1 greens, and tees are located in part, or completely, on
2 soils where the seasonally high water table lies one
3 foot, to less than one foot, from the surface of the
4 ground. And this is according to the Queen Anne's
5 County Soil Survey.

6 Additionally, 67 percent of the proposed holes
7 are located in part, or completely, on soils where the
8 seasonally high water table lies within two feet from
9 the surface of the ground. And 27 percent of the
10 proposed holes are located in part, or completely, where
11 a seasonally high water table lies within four feet or
12 more from the surface of the ground.

13 In other words, the majority of the soils on
14 the site, 67 percent, the water table rises within two
15 feet of the surface, according to the soil survey.

16 It also showed that 81 percent of the holes
17 will reside upon soils that fall within the USDA
18 textural classification of being a sandy soil.

19 Q What is the significance of it being sandy
20 soil for our purposes here today?

21 A Well, one of the other studies that I have is



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1 the results of a study that was done on Cape Cod, where
2 the soils were primarily sandy, coarse textured.

3 What that study and a number of other studies
4 have shown is that generally as the texture of the soil
5 becomes more coarse, sandier, the ability of that soil
6 to reduce the movement of nitrate and pesticides to
7 groundwater diminishes. It's the clay and organic
8 content of soil which accounts for the majority of the
9 pesticides that are removed from leachate as they move
10 down through the soil column, combined with uptake by
11 the root system of the grass as well.

12 The coarser the soil, the more rapidly water
13 flows down through the soil column, so the less time it
14 resides within the root zone, therefore the less uptake
15 occurs by the grass plants, as the leachate moves down
16 through the soil column.

17 Obviously, on a sandy soil, with a high
18 permeability rate, a high filtration rate, water would
19 move quite rapidly through the soil, compared to a clay
20 soil, water would move much more rapidly. There would
21 be far less time for roots to uptake the nutrients and



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1 pesticides, less opportunity for other mechanisms, such
2 as volatilization, that is pesticides going up as a gas
3 into the atmosphere, less opportunity for uptake by clay
4 and organic particles in a coarse textured soil.

5 The bottom line is that what the other studies
6 have shown is that the sandier the soil, the lower its
7 ability to remove nitrogen and pesticides from water as
8 it passes from the treated surface down through the soil
9 column.

10 Obviously, the closer that treated surface is
11 to the water table, to the point where groundwater
12 occurs, the greater the amount of nitrogen and pesticide
13 that's moving through the soil column will actually
14 reach the water table itself. And very little change
15 occurs in nitrogen compounds and pesticides once they
16 reach the water table. Few of the removal mechanisms,
17 the breakdown mechanisms that occur in the unsaturated
18 zone of the soil column, are active in the saturated
19 zone.

20 Q I think my question to you was what effects or
21 what analysis did you develop of the effects of this



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1 golf course? Will you return to that question?

2 A Sure. Again, 67 percent of the proposed holes
3 are located on soils where the seasonal high water table
4 rise within two feet of the surface. Thirty-seven
5 percent of those proposed holes are located on soils
6 where the seasonally high water table reaches within one
7 foot of the surface. Eighty-one percent of the holes
8 reside upon sandy soils, coarse textured soils.

9 In other words, the conditions exist on the
10 proposed golf course, based upon the Queen Anne's County
11 Soil Survey which favor a relatively large amount of
12 nitrogen and pesticide movement to groundwater.

13 Now, if I can, what I'd like to do is to
14 describe the results of the Cape Cod study and the Penn
15 State study.

16 Q Fine. These are related documents that
17 analyzed similar situations?

18 A Yes. Here is a copy of the Cape Cod study.

19 MR. MURPHY: All right. I would offer this.
20 It's entitled "Groundwater Monitoring Study for
21 Pesticides and Nitrates Associated with Golf Courses on



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1 Cape Cod." I would offer this into evidence.

2 CHAIRMAN CORKRAN: Any objection?

3 MR. MURRAY: Mr. Murphy, is the purpose of
4 this to underlie or substantiate comments that Mr. Klein
5 is going to make?

6 MR. MURPHY: Yes.

7 MR. MURRAY: No objection.

8 CHAIRMAN CORKRAN: Okay. We accept it.

9 (Whereupon, the document was marked for
10 identification Citizens' Exhibit Number next in order,
11 and received in evidence.)

12 BY MR. MURPHY:

13 Q All right, Mr. Klein.

14 A Okay. In the Cape Cod study, this is one of
15 -- two of the most definitive studies of the movement of
16 fertilizers and pesticides from managed turf, from golf
17 courses, in particular, with the case of this study.
18 The other of the two definitive studies is the Penn
19 State study that was introduced as an exhibit during the
20 last day of testimony.

21 The significance of this particular study is



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1 that the investigation took place on Cape Cod, which is
2 sandy. They looked at four golf courses. They
3 installed monitoring wells upstream, in groundwater --
4 of these four golf courses. They installed a well above
5 the point where groundwater would flow -- begin flowing
6 beneath the golf course, as it travels out towards the
7 ocean, or some other discharge area. Then they
8 installed monitoring wells within fairways, greens, and
9 tees of the four golf courses.

10 The significance of the Cape Cod study, those four
11 golf courses, is that as the Queen Anne's County Soil
12 Survey shows for the Queenstown Harbour Golf Links, the
13 soils at those four Cape Cod golf courses were sandy in
14 texture.

15 One of those four golf courses, the Falmouth
16 Golf Course, has soils that, according to the Queen
17 Anne's County Soil Survey, are quite similar.

18 Also, the depth to groundwater for these array
19 of monitoring wells that were used on these four golf
20 courses on Cape Cod ranged anywhere from five feet below
21 the surface, down to 56 feet below the surface.



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1 Again, at Queenstown Harbour, what we are
2 talking about is depths to the seasonally high water
3 table, anywhere from one to four feet below the surface
4 for the vast majority of the holes, and again, 81
5 percent of the holes are on sandy soils, resembling
6 those at Cape Cod.

7 What the study found was that for the 17
8 pesticides that were applied to the fairways, greens,
9 and tees at the four golf courses, ten were found in
10 monitoring wells beneath the golf courses.

11 According to the environmental assessment,
12 Queenstown Harbour Golf Links, which I think was also
13 admitted last time, six of the eight -- six of the ten
14 pesticides that were detected in the Cape Cod golf
15 course wells were going to be used at the Queenstown
16 site.

17 The pesticides that were found in the wells at
18 the Cape Cod sites, they were found about twice as
19 frequently beneath the greens and tees as they were
20 beneath the fairways.

21 The concentration of one of those pesticides,



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1 chlorpyrifos, C-H-L-O-R-P-Y-R-I-F-O-S, reached one-tenth
2 of a microgram liter. That's equal to a part per
3 billion. One-tenth of a microgram liter.

4 The EPA, in a document entitled "Ambient Water
5 Quality Criteria for Chlorpyrifos," published in 1986,
6 showed that to protect a saltwater system, to protect a
7 tidal system, the concentration of chlorpyrifos should
8 never exceed .0056 micrograms per liter, parts per
9 billion. That's roughly 16 times lower than the
10 concentration that was detected in one of the monitoring
11 wells located the Falmouth Golf Course on Cape Cod.

12 That chlorpyrifos concentration that exceeded
13 the EPA standards by 16 fold was found 35 feet below the
14 surface. In other words, even after the leachate passed
15 through 35 feet of soil, resembling those found on the
16 Queenstown site, the chlorpyrifos concentration was
17 still 16 times higher than the EPA's standard for
18 estuarine systems, for saltwater systems.

19 They also found that the nitrate concentration
20 beneath the fairways, greens, and tees, when compared to
21 the nitrate concentration of groundwater before it



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1 flowed beneath the golf course, in that one well located
2 upstream of the golf course, so to speak, that the
3 nitrate concentration increased by anywhere from ten to
4 66 fold in the wells beneath the fairways, greens, and
5 tees.

6 At the Falmouth Golf Course, where they used
7 slow release fertilizers, the same -- one of the
8 portions of the integrated pest management system that
9 was described at the last hearing -- even where they
10 used slow release fertilizers, the nitrate
11 concentration, compared to the background levels, were
12 ten to 24 times higher than they were.

13 So, what it shows is a tremendous increase in
14 not only the nitrate concentration beneath the golf
15 course. What the Cape Cod study also showed was that
16 even after passing through 35 feet of soil, resembling
17 those at the Queenstown Harbour Golf Links, that the
18 pesticide concentrations are still far in excess of what
19 the EPA recommends as being safe for protecting aquatic
20 life.

21 Q What effect -- the reason for citing these



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1 studies -- do you have any opinion as to whether there
2 would be nitrate movement from the Queenstown Golf
3 Course to, for example, Queenstown Creek?

4 A Well, I think that the Cape Cod study shows
5 that beneath golf courses there is a tremendous increase
6 in the nitrate concentration in groundwater.

7 The Penn State study also showed that the
8 practices that are used on golf courses increase nitrate
9 levels also. There they found that irrigation, the
10 amount of nitrate found in leachate beneath plots, grass
11 plots, that were irrigated, versus those that just
12 received natural rainfall, there the nitrate
13 concentration averaged 1.6 times higher than what you
14 have with only natural rainfall. And this is on a soil
15 where the ability to uptake nitrogen is far greater than
16 what you'd have at the Queenstown Harbour Golf Links
17 site.

18 The Penn State study showed that the soils
19 that they examined were clay soils, with a very slow
20 infiltration rate. Those two factors would make for a
21 much greater uptake of nitrogen as it passes through the



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1 soil column than you would have on a sandy soil.

2 Also they found that the levels of 24D that
3 reached a depth of six inches below the surface on this
4 very clay soil were up to three times greater than EPA
5 standard for drinking water. The EPA recommends a
6 maximum of 100 parts per billion of 24D for drinking
7 water. The concentration found in the Penn State study
8 was as high as 317 microgram per liter, way in excess of
9 drinking water standards.

10 Again, what these two studies show is that,
11 first of all, there is a tremendous increase in the
12 nitrate level. And pesticides do reach levels which
13 threaten the use of water as a drinking water source.
14 It also threatens the health of aquatic organisms that
15 are exposed to that groundwater beneath the golf
16 courses.

17 If the leachate that is moving -- that moves
18 down through the Queenstown Harbour Golf Links site,
19 moves towards Queenstown Creek, Little Queenstown Creek,
20 or the Chester River, at this point in time there is no
21 reason not to believe that it won't result in an



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1 increase in the nutrient concentration in Queenstown
2 Creek or the Chester River, and that -- and it may well
3 expose organisms within both those tidal systems to
4 pesticides which they are currently being exposed to.
5 Again, at possibly concentrations 16 times higher than
6 the EPA recommends as being safe.

7 Q Did you analyze the effect, if any, the sewage
8 treatment plant?

9 A Yes. What the EPA has found is that the
10 concentration of nitrate from a soil absorption system,
11 similar to the type that's being proposed for the
12 Queenstown Harbour Golf Links, the concentration is
13 about 25 milligrams per liter of nitrate. The same
14 concentration, that is the drinking water standard for
15 nitrate, is about 10 milligrams per liter of nitrogen.

16 According to a study that the U.S. Geological
17 Survey did on the Eastern Shore, the average nitrate
18 concentration, the background concentration, is about
19 one to three micrograms -- milligrams per liter.

20 So, the concentration of nitrate coming out of
21 these soil absorption systems is going to be anywhere



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1 from eight to 25 times higher than the background
2 concentration of nitrogen in groundwater on the Eastern
3 Shore and two and a half times higher than the drinking
4 water standard. Of course, that will be reduced through
5 dilution, as it moves through the groundwater system,
6 but a good portion of that nitrate that's released from
7 the soil absorption system will reach some body of
8 water, some surface body of water eventually. Until the
9 hydrogeologic study is done of the site, you can't say
10 whether that body of water is going to be Queenstown
11 Creek, Chester River, or some other waterway.

12 Q Did you analyze the parking lot and its
13 possible effect on the aquatic resources?

14 A Yes. I took a look at the proposed stormwater
15 management plan for the parking lot and pro shop that's
16 been proposed for this site.

17 What I found was, using equations developed by
18 the Critical Areas Commission in their ten percent
19 document for stormwater, that the amount of -- that the
20 stormwater run-off from the parking lot and the pro shop
21 will transport 127 pounds of nitrogen, 17 pounds of



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1 phosphorus, 455 pounds of oxygen -- material, and 15
2 pounds of heavy metals every year to the receiving
3 waters. That is, to the pond that's proposed to receive
4 the run-off from the parking lot and the pro shop.

5 The amount of toxic metals, copper, lead, and
6 zinc, that would be released from those impervious
7 surfaces, from 4.6 acres of impervious surfaces, would
8 equal the amount of toxic metals that you would get in
9 run-off from 359 acres of crop land, which is 1.5 times
10 more land than is currently being farmed on the site.

11 So, the toxic metal loadings -- toxic metals
12 mostly come from automobile exhaust and automobile
13 operation -- the amount of toxic metals derived from
14 that parking lot and the roof of that pro shop will be
15 1.5 times higher than the amount that would be derived
16 from the land that's currently being farmed on the site.

17 The trouble is is that that run-off is going
18 to be diverted to a stormwater management pond. It
19 could have some rather serious implications if that pond
20 isn't lined, first of all.

21 According to the Queen Anne's County Soil



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1 Survey, extensive portions of the soils at the
2 Queenstown Harbour Golf Links site are subject to rapid
3 seepage in the sub-surface or the substrata. That is,
4 that if you install a pond in those soils, in those
5 portions of the site where rapid seepage does occur,
6 that considerable portions of that stormwater that comes
7 from the parking lot and from the pro shop, that's
8 delivered to one of those ponds, that stormwater could
9 then seep into the near surface aquifer, taking along
10 with it a good portion of the pollution that is
11 delivered to it.

12 The other problem is is that non-tidal --
13 vegetated non-tidal wetlands, I believe, according to
14 the plans that were submitted by the Applicant,
15 vegetated non-tidal wetlands occur within the pond
16 that's designated for receiving the run-off from the
17 parking lot and pro shop.

18 The copper concentrations alone in run-off
19 from developed areas, as an average, range about 15
20 times higher than the level that the EPA has deemed safe
21 for copper. The EPA says that you shouldn't expose



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1 aquatic organisms to more than three parts per billion
2 of copper. The average concentration of copper in run-
3 off from paved surfaces is about 45 parts per billion.
4 The maximum goes up to about 114 parts per billion.

5 I'm concerned that the toxics that will be
6 contained in the stormwater run-off from that parking
7 lot could, over the long term, accumulate within the
8 sediments of that vegetated non-tidal wetlands and turn
9 it into an un-vegetated non-tidal wetlands. In other
10 words, it could exert a toxic effect upon the plants
11 growing within the non-tidal wetland.

12 Additionally, according to a document put out
13 by the Metropolitan Washington Council of Governments,
14 the best that a pond can do, in terms of removing toxic
15 pollutants from stormwater run-off is to reduce it by
16 about 60 percent.

17 If the safe concentration is three, and the
18 average concentration is 45, reducing the concentration
19 by just 60 percent isn't going to get you down to the
20 safe level. It will get you down to about 15 or 20
21 parts per billion, and the safe level is three.



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1 It would take other stormwater management
2 techniques, such as infiltration, which I believe was
3 ruled out on this site, or something like a peat sand
4 filter, which is being experimented with presently in
5 the Washington, D.C. area, as a means for getting the
6 same pollutant reductions from stormwater run-off that
7 you would get from infiltration. If you could either
8 use infiltration or a peat sand filter, you'd reduce the
9 heavy metals in the run-off by about 95 percent. It
10 would get you down to the safe level. It would get you
11 down to about that point.

12 Q Have you studied the relationship of the
13 groundwater to the ponds?

14 A Well, I have a concern there. If the proposed
15 ponds on the site won't be lined, even though they won't
16 be receiving stormwater run-off from the paved surfaces,
17 it would still be a problem.

18 It's my understanding that the application for
19 a water appropriation permit, the application that was
20 submitted to the Water Resources Administration, called
21 for removing up to 35,000 gallons a day of water,



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1 surface water from the ponds on the site.

2 If the ponds are not lined with an impermeable
3 material, and if the ponds happen to be sited in soils
4 that do have rapid seepage, if they exchange freely with
5 groundwater, and if the ponds actually penetrate the
6 groundwater -- that is, they are excavated down to the
7 point where they would actually be excavated below the
8 water table elevation -- and again, what the soil
9 survey shows is that about two-thirds of the soils on
10 the site have a seasonally high water table within two
11 feet of the surface, within two to four feet of the
12 surface.

13 If those ponds penetrate groundwater and they
14 are not lined, and you're pulling 35,000 gallons a day
15 of water out of those ponds, you could have the effect
16 of increasing saltwater intrusion into the near surface
17 aquifer. You could literally pull tidal water in from
18 the Chester River and Queenstown Creek into the near
19 surface aquifer. You could lower the water table on
20 portions of the site, which might have the effect of de-
21 watering, lowering the water table below the existing



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1 wetlands on the site, having a significant adverse
2 effect upon those wetlands.

3 Q Mr. Klein, let me ask you something in an
4 entirely different area, but it relates to your studies
5 on golf courses. Are you aware of any literature
6 dealing with the relationship of wildlife to golf
7 courses?

8 A Yes. New York State and the Department of
9 Environmental Conservation has done some extensive
10 studies of the instance of wildlife poisonings after
11 feeding on treated turf, whether for a lawn or a golf
12 course. They have documented a rather long list of
13 poisonings of waterfowl, particularly geese and brant
14 that have occurred after those geese -- after those
15 waterfowl have grazed either upon grass or other birds
16 have grazed upon insects or worms on grass that's been
17 treated with particularly insecticides.

18 The insecticides that have been most
19 frequently implicated with the wildlife mortalities are
20 diaznon, chlorpyrifos -- the same one that caused the
21 problem at the Cape Cod golf course site, that is



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1 proposed for use at this site -- isophenphous, and I
2 believe Seven was the fourth pesticide.

3 To give you some examples, 100 red wing
4 blackbirds were killed after feeding upon a lawn that
5 was treated with isophenphous. Six brant were killed
6 after feeding on a golf course that had been treated
7 with isophenphous. One hundred and forty Canada geese
8 were killed by the pesticide -- seven ducks were killed
9 by diazonon that had been applied to a lawn. Four
10 Canada geese were killed by diazonon applied to a golf
11 course located in New York State.

12 Again, three of the pesticides which have
13 caused wildlife mortalities in the past are proposed for
14 use on the Queenstown Harbour Golf Links.

15 Again, what happens is is that with a golf
16 course you've sort of got -- you've got a situation
17 that's very attractive to waterfowl, particularly geese
18 and ducks. You've got a pond. In this case, you've got
19 a number of ponds, surrounded by large areas of open
20 ground. Fairways, greens, and tees, or rough. And
21 then you also have turf that's treated on a frequent



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1 basis with insecticides, the same insecticides, again,
2 which have been implicated in wildlife poisonings in the
3 past.

4 So, you have a situation where you've got a
5 proposed golf course located across the river from the
6 Eastern Neck Wildlife Refuge, a major nesting area,
7 located next to the Chester River, in an area where
8 large numbers of Canada geese occur each winter, and you
9 have a golf course that's going to have ponds on it, and
10 large areas of open lawn, conditions which attract geese
11 to it -- geese and ducks -- and one that is going to be
12 treated with three of the same pesticides which have
13 caused large mortalities of waterfowl in the past.

14 Q Mr. Klein, would you briefly compare what you
15 consider the possible environmental effects of the golf
16 course? Compare that with the current agricultural use?

17 A Well, again, with a -- using the study that I
18 conducted of the 11 golf courses, the effect of a
19 watershed that's dominated by farming appears to be
20 about half as severe as the effect of a watershed that
21 is dominated by golf courses.



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1 Again, agricultural waterways, they tend to be
2 moderately to slightly degraded. Watersheds dominated
3 by golf courses, moderately to severely degraded.

4 Things occur on a golf course that don't occur
5 on an agricultural field, which would tend to increase
6 the amount of nitrogen and pesticides which would make
7 their way to the groundwater.

8 In the case of nitrogen, you have a situation
9 where about the same quantities of nitrogen are applied
10 to the treated turf, but you've got a couple of
11 additional factors which would increase the amount of
12 nitrogen that would make their way into the groundwater;
13 irrigation and the presence of greens.

14 In order to meet U.S. Golf Association
15 standards for a green, a green has to be created by
16 excavating out a pit about three feet deep, and then you
17 fill it with something that's at least 93 percent sand.
18 It may or may not have an under drain system.

19 So, you've got a situation where you have a
20 green that's consisting of almost purely sand that goes
21 down at least three feet, yet most of the soils on the



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1 site have a seasonally high water table within one feet
2 to four feet of the surface. Except on those portions
3 of the site where extensive grading would be doing, you
4 could have relatively rapid passage of nitrogen, applied
5 to the surface of that green, down through the green, to
6 that area three feet below the surface, where it meets
7 the undisturbed soil.

8 With irrigation, studies have shown that where
9 irrigation is not properly done, irrigation alone can
10 increase the amount of nitrogen leaching to the water
11 table by two to 28 fold.

12 Where it is done, by tying it into moisture
13 sensors in the soil, then the amount of nitrogen that
14 leeches to the groundwater is greatly reduced. But it's
15 still not reduced to the point where it is the same,
16 necessarily, as agriculture because you're still
17 irrigating the golf course, irrigation water is still
18 being applied.

19 In terms of pesticides, again, the pesticides
20 that are applied to the greens, where you have something
21 that is again three feet of almost pure sand, movement



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1 of those pesticides from a treated surface, down to the
2 underlying soils, may be groundwater, is going to be
3 much more rapid than on other portions of the site where
4 the purity of the sand may not be quite as great.

5 Again, pesticides, like nitrogen compounds, if
6 you are applying more irrigation water to the golf
7 course, increases the likelihood of those pesticides
8 moving down into the groundwater.

9 But in the case of the Queenstown Harbour Golf
10 Links, I believe that a comparison between the amount of
11 pesticides that are presently being used on the farm,
12 with those that are proposed for use on the golf course,
13 would show that the proposed golf course, on a per acre
14 basis, will be receiving six to eight times more
15 pesticides per acre than the existing property is
16 receiving on a per acre basis.

17 Also, the number of pesticides that are going
18 to be used will be considerably greater. I think the
19 crop field was being treated with four to six different
20 pesticides. The golf course has been proposed to be
21 treated with -- I think it's up to 14 different



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1 pesticides.

2 But again, the significance is is that on a
3 per acre basis, each acre of the golf course is going to
4 be receiving six to eight times more pounds of
5 pesticides per year than the crop field would. If
6 you've got six to eight times more material present on
7 the surface, and you've got more water passing through
8 that surface, logic would indicate that you're going to
9 have a considerably greater amount of material moving
10 down to ground water than in the case with the
11 agricultural field. A considerably larger amount of
12 pesticides reaching the water table than on the farm
13 field.

14 Q Would the -- what would be the effect on
15 wildlife, comparing agriculture and -- I mean, I assume
16 that -- wouldn't the wildlife on the farms -- wouldn't
17 they be ingesting the chemicals the same as they do on a
18 golf course?

19 A Well, as I said before, three of the
20 pesticides that have been implicated in wildlife
21 mortalities in the past are proposed for use on the golf



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1 course.

2 Q Is the turf more attractive to wildlife than
3 bare fields would be?

4 A That I can't answer.

5 Q Okay. All right, Mr. Klein. Let's move to
6 another category here for the final question.

7 If you're going to determine the environmental
8 effect of this golf course, positive or negative, what,
9 in your view, studies would be necessary to be done?

10 A Well, one of the first things that needs to be
11 done is the Queen Anne's County Soil Survey is not a
12 definitive survey of the soil conditions at the
13 Queenstown Harbour Golf Links. The soil survey is too
14 general, too broad to be used in evaluating conditions
15 at the Queenstown Harbour Golf Links, in terms of its
16 suitability for a golf course.

17 There should be an on-site investigation of
18 the soils made. A series of soil borings done
19 throughout the entire area proposed for the golf course.
20 But I'd also recommend looking at the entire tract,
21 because you may well find that if you want to keep the



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1 same number of holes, that you need to move to other
2 portions of the site, in order to find soil conditions
3 that are suitable for those holes.

4 First off, I would do a series of soil borings
5 throughout the site to characterize soil conditions, in
6 terms of texture, and also to document just how close to
7 the surface the water table comes. You can't depend
8 upon the soil survey for that.

9 In addition, there are also computer models
10 available, some of which are touted to be quite
11 accurate, that could be used for looking at various
12 management practices that could be applied to the
13 proposed golf course and seeing which of those would be
14 needed to minimize the amount of nitrogen and
15 fertilizer, nitrogen and pesticides, that would reach
16 groundwater.

17 In addition, a study protocol, such as the
18 WASP system -- Water Analysis Simulation Program --
19 developed by the U.S. Environmental Protection Agency, a
20 system such as that, a protocol such as that, should be
21 used for analyzing the effects of the proposed golf



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1 course upon Little Queenstown Creek, Queenstown Creek,
2 and the Chester River, to determine whether or not the
3 reductions that may occur in impacts associated with the
4 golf course have been reduced to the point where
5 significant adverse effects upon those tidal systems
6 won't occur.

7 Pumping tests need to be conducted in the
8 proposed locations for those ponds to find out whether
9 or not the maximum rate of water withdrawn from those
10 ponds will be sufficient to cause saltwater intrusion
11 into the near surface aquifer, or to lower the water
12 table sufficiently to adversely effect the wetlands that
13 occur on the site.

14 That soil survey should also be used to find
15 soils on the site, if they exist, that would be suitable
16 for infiltration, and perhaps consideration should be
17 given for relocating the parking lot and pro shop to
18 that point, if it is reasonable. The alternative would
19 be to consider using something like a peat sand filter
20 to handle the stormwater run-off from the impervious
21 surfaces on the proposed golf course.



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1 Obviously, a detailed integrated pest
2 management plan must be developed for the golf course,
3 but IPM alone is not a panacea. According to the
4 University of Maryland, IPM at best will reduce
5 pesticide needs by one-half.

6 If the proposed golf course receives six to
7 eight times more pesticides than the existing crop
8 field, cutting that in half still leaves you with three
9 to four times more pesticides applied per acre than the
10 existing agricultural operation achieves.

11 The person who is responsible on a day-to-day
12 basis for making the decisions about pest control,
13 irrigation, fertilizer use, should be a graduate of the
14 integrated pest management program that the University
15 of Maryland is developing right now for turf grass,
16 obviously.

17 Obviously, slow release fertilizers should be
18 used, but they alone won't guarantee that nitrogen
19 levels won't become a problem. Again, the Cape Cod study
20 showed ten to 24 times more nitrate in groundwater, even
21 where slow release fertilizers were used.



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1 Q Well, in your view do we have enough
2 information now --

3 A No.

4 Q -- to know whether there is going to be a
5 serious environmental effect or not?

6 A No. At this point all we can do is
7 conjecture.

8 Q Do we know where the groundwater goes?

9 A No.

10 Q Do we need to know that?

11 A Yes. We would also need to document what the
12 existing conditions are and set up a monitoring program
13 to detect any significant changes in those conditions
14 that might occur after the golf course is completed.

15 Q Are you familiar with what Baltimore County
16 has done in terms of monitoring the existing conditions?

17 A Yes. As a matter of fact, I have a copy of it
18 here. The Baltimore County Department of Environmental
19 Protection and Resource Management requires that the
20 waters associated with the proposed golf course, that
21 physical chemical and biological monitoring be conducted



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1 for one year before the golf course if built, and then
2 intensive monitoring continue for at least three years
3 thereafter. And after that three year period, periodic
4 monitoring continues to detect any significant adverse
5 effects that result from the golf course.

6 Q Is this stream monitoring program, is that
7 what is done?

8 A Yes.

9 Q That's for the studies, both before and after
10 a golf course is approved in Baltimore County?

11 A Yes.

12 MR. MURPHY: I would offer this. It's
13 entitled "Stream Monitoring Program."

14 CHAIRMAN CORKRAN: That's accepted.

15 MR. MURPHY: Thank you.

16 (Whereupon, the document was marked for
17 identification Citizen's Exhibit Number next in order,
18 and received in evidence.)

19 MR. MURPHY: That's all I have of Mr. Klein.
20 Oh, I'm sorry.

21 BY MR. MURPHY:



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1 Q Did you prepare a summary of your analysis of
2 the effects of -- your concerns with respect to the golf
3 course?

4 A Yes.

5 MR. MURPHY: I'm sorry. If I might have a
6 minute.

7 CHAIRMAN CORKRAN: We'll have a five minute
8 break.

9 MR. MURPHY: Thank you.

10 (Whereupon, there was a brief recess.)

11 CHAIRMAN CORKRAN: Are we ready? Have you
12 finished with --

13 MR. MURPHY: I have. We're not going to
14 submit anything. We were looking for a document. We're
15 not going to submit anything.

16 CHAIRMAN CORKRAN: MR. Murray, if you are
17 ready.

18 CROSS-EXAMINATION

19 BY MR. MURRAY:

20 Q Mr. Klein, your publication entitled "The
21 Relationship Between Stream Quality and Golf Courses"?



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1 A Yes.

2 Q When was that published?

3 A It's being published by my consulting firm,
4 Community and Environmental Defense Associates.

5 Q But not any professional journal?

6 A Unfortunately, it costs \$400 to \$600 to
7 publish in a professional journal these days.
8 Unfortunately, business hasn't been that good.

9 Q And looking at that document just for a
10 minute, before we move on to others, you indicate in
11 your conclusions on page 16 that the apparent
12 degradation may be related to base flow reductions.
13 What does that mean?

14 A Dry weather flow. The -- when a week or more
15 has passed since a rainfall has occurred, the vast
16 majority of the water that's carried by a waterway, a
17 stream channel, is groundwater, it's base flow.

18 Q That wouldn't have anything to do with this
19 site, would it?

20 A Yes, it would. If there are any non-tidal
21 tributaries that receive base flow inputs from the



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1 Queenstown Harbour Golf Links site, it could --

2 Q But, do you know whether any such things
3 exist?

4 A Well, you haven't done a hydrogeologic study
5 yet to show where groundwater from the site goes to, so
6 we can't answer that question. Freshwater inflow is
7 important for estuarine systems as well.

8 Q What about a stream side buffer?

9 A Stream side buffer? You've done a fantastic
10 job of providing stream side buffers.

11 Q Channelization?

12 A You haven't proposed any.

13 Q What is that?

14 A Channelization is physically altering the
15 channel of a waterway, usually with heavy equipment. In
16 the old days, it was turning a winding waterway into a
17 straight line.

18 Q So, to the extent we don't have any, then it's
19 not a problem?

20 A No.

21 Q That question is -- or the answer was



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1 ambiguous. Does "No" mean "Yes" or does "No" mean "No"?

2 A Since you have such a nice buffer proposed
3 along the waterways on the proposed golf course,
4 channelization will not be a problem on the proposed
5 golf course.

6 Q And on-channels ponds. Do we have any of
7 those?

8 A I don't believe so. But off-channel ponds are
9 a problem also.

10 Q The golf courses that you have evaluated, I
11 guess they are listed in the document you were just
12 talking about?

13 A Yes.

14 Q They are of what vintage?

15 A What vintage? Well, it's hard to say. I
16 would say that most of them were built at least five or
17 ten years ago.

18 Q Are all or most of these golf courses in
19 environments similar to Queenstown?

20 A They are located within a different
21 geographical region. The Piedmont versus the Coastal



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1 Plain. The trouble is that in some respects, the impact
2 of a golf course could be greater in a Coastal Plain
3 than in the Piedmont, due to the poorer flushing
4 characteristics of a Coastal Plain system versus
5 Piedmont.

6 Q So, all of these are in the Piedmont?

7 A Yes.

8 Q You looked at some County data, I understand,
9 to assess the high water level of groundwater?

10 A The Queen Anne's County Soil Survey.
11 Actually, it's a U.S. Soil Conservation Service
12 document.

13 Q I see. But anyway, that was your source?

14 A Yes.

15 Q It may or may not accurately reflect actual
16 site conditions?

17 A I think at this point in time you ought to
18 assume that the data contained with the county soil
19 survey is not sufficient to layout the fairways, greens,
20 and tees on suitable soils.

21 Q Now, you also looked at the same source, as I



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1 understand it, to identify the soil texture and the
2 location of the various soils? Is that correct?

3 A The Queen Anne's County Soil Survey, yes.

4 Q And you characterized these soils, based on
5 this compilation of data, as very sandy?

6 A There are textures of soil that occur within
7 each one of those mapping units shown in the Queen
8 Anne's County Soil Survey. The same mapping units that
9 were shown in the plans that were submitted for the golf
10 course, which are very sandy.

11 Q Now, on a spectrum of one to ten, with sandy
12 being ten, how close are these soils to ten?

13 A Well, some of the textures listed in the Queen
14 Anne's County Soil Survey are tens. A lot of them are
15 eight and nines. But again, the best thing that can be
16 done at this point would be not to rely upon the Queen
17 Anne's County Soil Survey, but to do actual on-site
18 investigations, to do borings, to find out what's
19 actually there.

20 Q Insofar as your analysis assumes, I gather,
21 the worst case, that is that many of the soils are very



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1 sandy, and that the water table is relatively high, do
2 you disregard in that analysis the fact that most of
3 these columns also include ranges of clay?

4 A (Nods head affirmatively.)

5 Q And what happens with regard to the clay? Why
6 do you disregard that?

7 A I don't disregard it. Again, what I'm saying
8 is is that you can't rely upon the Queen Anne's County
9 Soil Survey to determine what the conditions are on the
10 site. Yet, that soil survey has been relied upon up to
11 this point.

12 You need to go on site with soil borings to
13 find out what the actual texture of the soil is. If the
14 worst case scenario is right and they are all quite
15 sandy, then obviously that portends some very high
16 nitrate and pesticide contamination of groundwater.

17 If, on the other hand, they are quite clayey,
18 then the potential for contamination is far less.

19 Q And you're saying, within the range of this
20 data, it could be either or both of some combination of
21 those extremes?



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1 A Yes.

2 Q How do you compare the grounds at the Cape
3 Code site to the Queenstown site, on what you know of
4 them?

5 A There, again, were four golf courses studied
6 at the Cape Cod site.

7 The Falmouth Golf Course, in terms of general
8 soil characteristics, and in terms of any soil
9 characteristics that occur in this part of the Coastal
10 Plains, most closely resembled soil conditions that do
11 occur in this part of the state.

12 That is, the soils on the Falmouth Golf Course
13 were sandy, with layers of clay within them.

14 Q Where in this study does it say that?

15 A Pardon?

16 Q Where in this study does it say that there
17 were layers of clay within the Falmouth --

18 A Are you referring to the Cape Cod golf course
19 study?

20 Q Yes.

21 A Okay. There is a section which describes



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1 conditions on each one of the golf courses. Let's see.

2 Q Mr. Klein, I'm looking at page 163.

3 A It's not on that page.

4 Q Well it says, "General geologic logs" and it
5 tells you what the legend says. And it doesn't seem to
6 have any clay at Falmouth, or am I misunderstanding
7 that?

8 A I believe I found it in some other portion of
9 this paper. It's going to take me a minute or so to
10 find it.

11 If you look on page 161, under "Regional
12 Hydrogeology."

13 Q Yes?

14 A Okay. The second paragraph. It looks like
15 the third sentence in. "Outwash plain sediments
16 generally consist of stratified sand and gravel, with
17 local silt and clay layers." When I read this
18 originally, I read this to apply to the Falmouth Golf
19 Course.

20 Q But in fact it doesn't, does it?

21 A I think it does.



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1 Q Okay. Well, look at page 163 then, and let's
2 look at that -- what appears to be a depiction of what
3 is in fact at Falmouth. And at least the page you gave
4 me shows brown, fine to coarse sand, and brown coarse
5 sand and gravel, to a depth of 12.6 below sea level.
6 And it doesn't show any clay.

7 A Yes. You're right about that.

8 Q So, at least to that extent there may be some
9 dissimilarities between the Queenstown soil
10 characteristics and the Falmouth soil characteristics?

11 A It could be. But again, since we're not
12 certain what the characteristics are at the Queenstown
13 site, it's hard to say.

14 Q We're not certain, but the USDA says that there
15 are different concentrations and layers of clayey
16 substance.

17 A It could be.

18 Q It could be there, or it could be that they
19 say it is there?

20 A They could be there, or they could not be
21 there. What the USDA says is that there can be a range



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1 of soil conditions.

2 Q You also, I think, talked about -- looking at
3 the Cape Cod study again -- nitrates?

4 A Yes.

5 Q In the table eight, at 170.

6 A Yes?

7 Q I think that in the averages columns, you get
8 a fairly wide variation, but don't all of them fall
9 below the health guidance level for nitrates for
10 drinking water?

11 A The averages do, but the maximums don't.

12 Q And where is the maximum?

13 A Under "range." For instance, under the
14 Eastward Ho Golf Course, you've got a range of .1 to 20,
15 2.8 to 30.

16 Q Yes?

17 A Yes.

18 Q And those are all above the range of drinking
19 water health?

20 A Yes. Ten is the standard.

21 Q Why does the conclusion then in this report



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1 indicate that nitrate concentrations can be handled with
2 reasonable changes in management practices?

3 A One of the things that they were assuming that
4 upon was the fact that the Falmouth Golf Course was one
5 of the -- was the only golf course out of the four where
6 they used slow release fertilizers. And there the
7 nitrate concentrations tended to be quite low.

8 But the significance of nitrate, as it relates
9 to the Cape Cod golf course study, isn't drinking water
10 quality. Again, it's nutrient enrichment.

11 Again, if you look at that last column,
12 overall range, it shows that even for the Falmouth
13 course, where they did slow release fertilizers, but the
14 drinking water standard was never exceeded, that in
15 comparison to background, the "B" well -- that first
16 entry under Falmouth -- the background concentration was
17 .1, but beneath the tees and the greens, it was 1.54 to
18 2.44.

19 So, a 15 to 24 fold increase in the
20 concentration of nitrogen, nitrate, in comparison to
21 background.



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1 Q In those specific pinpointed areas?

2 A Yes.

3 Q And that's based on test wells directly below
4 them?

5 A Thirty-five feet down in this case.

6 Q Sampling below them, anyway?

7 A Yes.

8 Q Once those kinds of concentrations hit the
9 groundwater, would they not dilute?

10 A They could dilute. But again, the total
11 loading, the total amount of nitrogen, would remain the
12 same. You would have a lower concentration, but a lower
13 concentration in larger amounts of water.

14 Again, the concern with this particular golf
15 course, the Queenstown Harbour Golf Links is is that if
16 there is a similar increase in groundwater
17 concentrations, that it could result in a large increase
18 in the nitrogen making its way into Queenstown Creek and
19 the Chester River. Not so much a public health concern,
20 drinking water. More a nitrification. It will
21 eventually cause problems with oxygen levels.



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1 Q At those kinds of concentrations?

2 A Yes.

3 Q What is that? A part per billion?

4 A No. Part per million.

5 Q So, 1.54 parts per million would cause
6 nitrification?

7 A No. If you had a 15 to 24 fold increase in
8 the concentration of nitrate in groundwater beneath the
9 Queenstown Harbour Golf Links site, and that moves into
10 the Queenstown Creek, which is already over enriched
11 with nutrients, it can only worsen the existing
12 situation.

13 Q But that -- I mean, what you just said assumes
14 that .10 under the ground currently.

15 A No. I'm assuming a similar increase in the
16 background nitrate concentration.

17 Q You're suggesting that the background nitrate
18 concentration there is what?

19 A It's one to three.

20 Q How do you know that?

21 A It's based upon a U.S. Geological Survey study



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1 of this area. I'm not saying it's one to three
2 underneath Queenstown Harbour Golf Links, but for the
3 Eastern Shore in general, that's the background
4 concentration.

5 Q One to three, or .1 to .3?

6 A One to three.

7 Q One to three. Is that general study related
8 to agricultural uses or any kind of uses?

9 A A number of uses.

10 Q So, it would be an average?

11 A But, agriculture, residential development,
12 industrial operations.

13 Q So, if the average on the shore is one to
14 three, and the highest point of concentration at
15 Falmouth was 1.54, doesn't that suggest that the result,
16 even in the most highly concentrated areas, would be
17 well within the normal existing background range?

18 A What if the concentration, the background
19 level, beneath Queenstown Harbour Golf Links is one, and
20 like the Falmouth Golf Course it increases 15 to 24
21 fold?



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1 Q But why would you expect a percentage
2 increase, as opposed to simply an arithmetical increase?

3 A Again, if you found at one situation where
4 there was a 15 fold to 24 fold increase in the
5 concentration of nitrate -- and the Penn State study
6 also showed that a 1.6 fold increase in the
7 concentration beneath well managed turf -- why wouldn't
8 it --

9 Q But isn't -- in that case, as well as this,
10 the arithmetic difference between the two?

11 A No.

12 Q Percentage is not a real measure, is it, of
13 what you have added, except in comparison to the
14 background?

15 A What's important here is an increase in the
16 total quantity of nitrogen that makes its way into
17 groundwater.

18 Q Exactly.

19 A Yes.

20 Q And this study says, from .1 to 1.54 parts per
21 million, at the most concentrated areas. Right? That's



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1 where you are getting your 15 percent?

2 A What it showed was that the concentration in
3 the most concentrated areas above the background level
4 was 15 to 24 times higher.

5 Q Right.

6 A Right.

7 Q But we don't have any -- you don't have any
8 idea what the background level at this site today is?

9 A Not specifically this site. I think that's
10 something that your study should uncover.

11 Q And what evidence do you have that there would
12 be a 15 percent increase over whatever that background
13 is --

14 A Fifteen fold. Not 15 percent. Fifteen fold.

15 Q Well, let's say that. Let's say 15 fold.

16 A Again, they found that when irrigation was not
17 properly practiced on turf, that irrigation alone
18 increased the amount of nitrogen making its way into
19 groundwater by two to 28 fold. So, irrigation alone
20 could increase the background concentration.

21 Combine that with application of fertilizers,



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1 nitrogen, to a green, which consists of at least 93
2 percent sand, extends at least three feet below the
3 surface, plus is being irrigated, there's a large
4 potential there for increasing the background
5 concentration of nitrogen.

6 At this point all we can do is speculate about
7 it. The way to find out is to do the studies that I
8 mentioned earlier. They'll tell you. They'll give you
9 a much firmer handle on what that actual increase may
10 be.

11 Q Or if there is any increase at all?

12 A I think it's unlikely that there wouldn't be
13 any increase at all, but anything is possible.

14 Again, the literature shows at this point in
15 time that managed turf results -- particularly irrigated
16 turf, results in increases in the concentration of
17 nitrate.

18 Again, at Penn State, where they irrigated the
19 plots, versus natural rainfall, the increase was 1.6
20 fold.

21 At Cape Code, where they even used slow



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1 release fertilizers, the increase over the background
2 concentration was 15 to 24 fold.

3 Q What was the use of the golf course prior to
4 the time it was created as a golf course?

5 A Which golf course.

6 Q We're talking about Falmouth. I guess let's
7 continue that discussion.

8 A I haven't the foggiest.

9 Q You, I believe, indicated that there was a
10 chemical called chlorpyrifos?

11 A (Nods head affirmatively.)

12 Q It has another name?

13 A I'm not sure what the common name is.

14 Q In table seven, it indicates that the -- only
15 one place was that found of the, you know, approximately
16 16 to 20 well sources. What does that tell you?

17 A What it tells me is is that we've got a
18 problem with pesticides. The detection limit, which is
19 shown in the second column under MDL -- "Meeting Detection
20 Limit" -- the detection limit for chlorpyrifos is 0.05
21 micrograms per liter. The EPA standard for chlorpyrifos



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1 is 0.0054 microgram per liter.

2 What that tells me is is that chlorpyrifos can
3 still be present in concentrations which exceed the
4 maximum recommended by EPA, at ten times less than it
5 can be detected.

6 What that tells me is is that all those wells
7 where chlorpyrifos was not detected, all it means is
8 that it wasn't present above .05 micrograms per liter.
9 It doesn't mean that the concentration was at a safe
10 level.

11 Again, what is significant is the fact that at
12 a well, which was located 35 feet beneath the surface,
13 the maximum concentration was 0.1 micrograms per liter,
14 16 times higher than the EPA recommends.

15 Q But, the fact that approximately 15 or 16
16 wells showed no detection and one did, leads you to
17 conclude that it was present, nonetheless, but in
18 smaller concentrations, everywhere else?

19 A Nobody can say that, and it was 11 out of 12
20 wells. One out of 12 wells. Unless you are counting
21 the background wells, too.



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1 Q Yes, I guess I was. Fifteen of 16, including
2 the background wells.

3 Now, it also indicates on that same page that
4 "Chemicals that may have leached to groundwater under the
5 greens and tees -- the area where you've identified are
6 the greatest concentrations of leached chemicals -- "do
7 not appear to have migrated."

8 Now, why would that be, and why would that not
9 be the case at the Queenstown site?

10 A Again, since a hydrogeologic study has not
11 been done at the Queenstown site, we don't know where
12 groundwater goes to from the Queenstown site.

13 If those same concentrations occur in
14 groundwater beneath the Queenstown site, and then they
15 move to Queenstown Creek, Little Queenstown Creek, or
16 the Chester River, again they could expose organisms
17 within those waterways to concentrations 16 times higher
18 than the EPA deems safe.

19 Q On page 170, there is a sentence that "None of
20 the 12 currently registered turf pesticides looked at in
21 this study were detected in concentrations greater than



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1 one-fifth of the health guidance levels."

2 A Yes. The drinking water standard is much
3 higher than the standard for protecting aquatic life.
4 If you are only drinking a pesticide every now and then,
5 you can take a lot more of it than if you're drinking it
6 all the time.

7 Q Now you've mentioned the idea of an IPM as
8 being an appropriate approach in that, I believe, you
9 recognize that it is a dynamic sort of thing. You take
10 into account a lot of inputs and it is variable,
11 depending upon what's happening in the real world. Is
12 that a fair summary of something you said?

13 A You need somebody who knows what they are
14 doing, who is trained in IPM, in order to apply it
15 properly.

16 Q But you are familiar with the concept, and
17 insofar as golf course management goes, it's the right
18 way to go?

19 A It's a lot better than past practice. But,
20 it's not a panacea.

21 Q On page 171, there is a chart that indicates



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1 the mobility and persistence of pesticides. Is that the
2 kind of data that's useful when using or developing your
3 IPM?

4 A Yes.

5 Q Again, on 171, on the lower right section
6 called "Conclusions," it says "The use of turf
7 pesticides by four golf courses with vulnerable
8 hydrogeology was found to have minimal impact on
9 groundwater quality." Do you dispute that conclusion?

10 A Yes. Because what they are basing that
11 conclusion upon is, again, were health guidance levels,
12 drinking water standards violated. No, they were not.
13 That's true.

14 Unfortunately, what they did not do was look
15 at the concentrations that are needed to protect aquatic
16 life.

17 The sole purpose in doing this study, the Cape
18 Cod golf course study, was to determine whether or not
19 golf courses are threatening the quality of public water
20 supplies on Cape Cod.

21 Since none of the pesticides or nitrate



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1 appeared in concentrations in excess of the drinking
2 water standard, then it was correct to say that golf
3 courses do not threaten the quality of the drinking
4 water supplies, based upon the results of this study.

5 But again, if they would have taken it further
6 to look at the effects upon aquatic life, they would
7 have arrived at a different conclusion. Or if they
8 would have had the data available to them from Penn
9 State, where the 24D concentration exceeded the drinking
10 water standard, they might have reached a different
11 conclusion.

12 Q You also talked about the relative pesticide
13 use per acre.

14 A Yes.

15 Q Where was your number -- I think you said six
16 to eight something or other -- six to eight times --

17 A (Nods head affirmatively.)

18 Q -- the pesticide per acre by a golf course
19 than agriculture. Where did those numbers come from?

20 A There was an environmental assessment done by
21 Dr. Mark Weltlich for the Queenstown Inn Golf Course,



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1 which I believe is the former name for this site, in
2 which he compared the amount of pesticides used on the
3 existing corn and soybean fields with the amount that
4 would be applied to the roughs, open fairways, greens,
5 and tees.

6 What he concluded was that the total quantity
7 of pesticides applied to the entire crop field would be
8 greater than the total quantity applied to the entire
9 golf course.

10 What he also showed with his data was that
11 since you are going to have far less acres in golf
12 course than you have in a crop field, that the quantity
13 of pesticides applied on a per acre basis was six to
14 eight times greater than the quantity applied to a corn
15 field, soybeans.

16 Q The quality is different as well?

17 A Huh?

18 Q The quality is different as well?

19 A Quality? What do you mean?

20 Q They are not talking about the exact same
21 pesticides that are used in agricultural practices for



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1 use on a golf course?

2 A That's right. Things like atrozene are not
3 going to be used on a golf course. I believe that the
4 corn and soybean field is treated with four to six
5 different pesticides, while the golf course is proposed
6 to be treated with 14 different ones.

7 And I believe also that the -- I think there
8 was only one of the three pesticides that had been
9 implicated in the waterfowl poisonings that's used on
10 the corn and soybean fields, but three of them are going
11 to be used on the golf course.

12 Q On the implications, let's move to that, for
13 wildlife. Is it not the case that those are simply
14 examples of misuse?

15 A No. No. I think those are examples of proper
16 use of pesticides.

17 Q So, it is unavoidable in your opinion?

18 A I think that unless you take measures to
19 discourage wildlife from using your golf course, that
20 the likelihood of it happening is far greater.

21 I think IPM could reduce the quantities that



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1 are applied to the golf course, but without those
2 additional measures, it's not going to eliminate the
3 threat.

4 Q Well, isn't that just making the same point in
5 a different way? The time you use it? The
6 attentiveness to the type of wildlife that might be
7 there? What they would eat, or drink? What the weather
8 is calling for? The use of irrigation? The particular
9 selection of chemical? The time of year it is being put
10 on? Isn't that exactly what the IPM is all about?

11 A That's what IPM is intended to do, but again
12 IPM, at best, can only reduce pesticide use by 50
13 percent.

14 I presume that that listing of pesticides and
15 the application rates that was contained in the
16 environmental assessment that was prepared for the
17 Queenstown Harbour Golf Links, reflected IPM.

18 I assume that -- no? Yes? I haven't the
19 foggiest.

20 Q I can't testify.

21 A Well, all I can go upon is the pesticides that



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1 you all have recommended using, or proposed using on the
2 golf course. Again, three of the four pesticides that
3 have caused waterfowl poisonings are proposed for use on
4 the Queenstown Harbor Golf Links.

5 Q Well, let's suppose that we removed those
6 three.

7 A Yes.

8 Q Would that be a step in the right direction?

9 A God, yes. But before you do that, why don't
10 you take a look at what conditions exist on the golf
11 course, take a look at what options might be available
12 for discouraging waterfowl from using the golf course,
13 and then figure out whether or not the disadvantages
14 associated with not using those pesticides justified the
15 benefits?

16 Q The parking lot and pro shop issue. You
17 assumed that all of that area is paved?

18 A I assumed that there is 4.6 acres of
19 impervious surface there. I believe I got that from
20 your environmental assessment.

21 Q Well, again, it may be definitional, but you



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1 said "paved" once or twice, and then you said "impervious
2 surface" another time. Are those two things identical?

3 A No. If you use porous pavement, they are not
4 identical. But since the stormwater management proposal
5 excluded infiltration, I presumed therefore that the
6 soils beneath the parking lot were not suitable for a
7 porous system that would have to rely upon infiltration.
8 If you can use porous pavement, it's a great solution.
9 That will take care of the problem.

10 Q The heavy metals and other things that you
11 expressed some concern about from the parking and
12 building area, if they don't present a problem if they
13 infiltrate through the surface of the soil, is that
14 because of some biological breakdown, or chemical
15 mechanisms that occur when they get into the surface
16 layers of the soil?

17 A What I was referring to was actually the heavy
18 metals. Heavy metals have a tremendous affinity for
19 clay particles.

20 Again, if the soil borings that you do on the
21 site show that the soils are suitable for infiltration,



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1 that is if the infiltration rate is not only suitable,
2 but the clay content is up there at a reasonable level,
3 if you infiltrate on those soils, then the vast
4 majority, at least 95 percent of those heavy metals that
5 pass through the soil column should be held, absorbed on
6 the surface of the clays.

7 Q What about the drainage? What have you
8 assumed about the drainage from the parking lot area to
9 -- I think you said it appeared to you as if it drained
10 into a pond. What's between? I mean, is it underground
11 piping, or is it culverts, surface?

12 A I haven't seen any description of how run-off
13 is going to get from the parking lot or pro shop to the
14 pond.

15 Q Well, would it make a difference if it were,
16 for example, a grassed culvert, and would the opportunity
17 for absorption in the soil occur there?

18 A Unless you put check dams in, no.

19 Q Put what?

20 A Check dams. Unless you create an area where
21 water can be held long enough for it to infiltrate into



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1 the soil, it's not going to make any difference. Again,
2 that's based upon the 10 percent publication that the
3 Critical Areas Commission compiled.

4 Q But you understand, don't you, that the
5 parking lot and the buildings are outside the critical
6 area?

7 A Yes.

8 Q Your publication called "Protecting the
9 Aquatic Environment from the Effects of Golf Courses" --

10 A Yes. Is that the May 1990 version you've got
11 there?

12 Q I have a January 1990 --

13 A That's an old version. It's out of date.

14 Q How is it different?

15 A The sections on fertilizers and pesticides
16 were upgraded to include the Cape Cod study and the Penn
17 State study results. That was that bound publication,
18 hard stock cover, brown. That's it. Does it say May
19 1990? Okay.

20 Q You indicate on -- well, it's the first page
21 of the text, page one, that "Is it possible to construct



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1 and operate a golf course without damaging streams,
2 lakes, tidal waters and other aquatic systems?" Your
3 answer is "Probably."

4 A (Nods head affirmatively.)

5 Q And that depends upon the site-specific
6 characteristics, a proper design, proper management,
7 proper monitoring, the kinds of things that you've
8 talked about?

9 A Yes.

10 MR. MURRAY: That's all I have. Thank you.

11 CHAIRMAN CORKRAN: Okay. Thank you.

12 MR. MURPHY: I have just a few questions.

13 REDIRECT EXAMINATION

14 BY MR. MURPHY:

15 Q In response to Mr. Murray's questions about
16 your analysis of the Cape Cod study, am I correct in
17 thinking that the Cape Cod study was done to determine
18 whether wells on Cape Cod would be harmed by golf
19 courses, drinking water wells?

20 A That's correct.

21 Q And that's not the same test we have today



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1 before us in terms of effect on aquatic resources; is
2 that right?

3 A Right.

4 Q And what you did was take the raw data that
5 the Cape Cod study developed as to what pesticides and
6 nitrates were discovered as leaching down and applied
7 them to a somewhat different test of effect on aquatic
8 resources; is that a fair summary of what you've done?

9 A (Nods head affirmatively.)

10 Q All right. The parking lot and the buildings
11 associated with this course, they're outside the
12 critical area, are they not?

13 A Yes.

14 Q But is it your contention that drainage from
15 them will be into the critical area?

16 A I believe that the pond that's shown as the
17 receiving body for the run-off from the parking lot and
18 pro shop is within the critical area in whole or in
19 part.

20 Q Do you want to look at it?

21 A In part.



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1 Q In part?

2 A Yes.

3 Q All right. Mr. Murray asked you about the
4 quotation in your book, whether it was possible to
5 design a golf course without adverse environmental
6 effects, and you say in your publication that it is.

7 A I say that it probably is. The reason why I
8 say that is that all the measures that are being used
9 today to minimize the adverse effects from golf courses
10 are relatively recent developments. There haven't been
11 enough golf courses built with the new criteria to find
12 out whether or not it isn't impossible to build and
13 operate a golf course and maintain all those measures to
14 minimize the adverse effects.

15 Q Now, among the criteria you listed in the
16 publication about how to design a golf course to
17 minimize environmental effects, was proper site
18 selection one of the criteria?

19 A Yes.

20 Q And would that relate to choosing a site that
21 has soils which are able to filter the contaminants



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1 before they get to the ground water?

2 A Yes.

3 Q So that would be a site that has more clayey
4 soils as opposed to sandy soils; would that be correct?

5 A That's correct, and a greater depth to the
6 water table.

7 Q And would site selection also be influenced by
8 proximity to existing stressed aquatic resources, such
9 as Queenstown Creek?

10 A Yes, or resources that are very sensitive,
11 high quality resources that are very vulnerable. Both
12 of those two extremes of the spectrum would be areas
13 that you would want to avoid if you could.

14 Q And something like the abundance of wildlife
15 in the area would relate to proper site selection, would
16 it not?

17 A That's correct.

18 MR. MURPHY: That's all I have.

19 CHAIRMAN CORKRAN: All right. Thank you. Let
20 me ask -- let's go off the record for a minute.

21 (Whereupon, there was a discussion off



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1 the record.)

2 CHAIRMAN CORKRAN: Shall we proceed? We're
3 back on the record.

4 MR. MURPHY: Mr. Gerber.

5 MR. MURRAY: Mr. Corkran, may I address the
6 commission real quick?

7 CHAIRMAN CORKRAN: Yes, you may.

8 MR. MURRAY: Mr. Murphy and I did exchange
9 documents. To my knowledge, I've given him all but two
10 documents, which I declined to give to him because I
11 don't know if I'm going to use them. That would depend
12 solely on the testimony of one of his anticipated
13 witnesses. I think it would be unfair for me to have to
14 disclose that in advance.

15 CHAIRMAN CORKRAN: All right. Thank you.

16 MR. MURPHY: Mr. Gerber, would you state your
17 name for the record.

18 MR. GERBER: John Edward Gerber, III.

19 MR. MURPHY: And would you take the oath of
20 office -- or the witness oath.

21 Whereupon,



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1 JOHN EDWARD GERBER, III,
2 a witness, called for examination by counsel for the
3 Protestants, was duly sworn, and was examined and
4 testified as follows:

5 .
6 .

7 DIRECT EXAMINATION

8 BY MR. MURPHY:

9 Q Would you tell the commission your background,
10 Mr. Gerber.

11 A I have a bachelor of science from Cornell
12 University in New York and a master's in ecology and
13 comparative behavior from Johns Hopkins, and I've worked
14 the last seven years for a private, non-profit wildlife
15 group.

16 Q What is that group?

17 A It's Chesapeake Wildlife Heritage, and we
18 build and manage wetland and other wildlife habitat on
19 private lands through the State of Maryland, through the
20 Chesapeake Bay watershed.

21 Q You want to make it clear that you're not



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1 appearing here as an official representative of that
2 group.

3 A No, I'm not.

4 Q Where do you live?

5 A I live about a mile up the river from The
6 Lord's Gift, on the corner of Winchester Creek and the
7 Chester River.

8 Q And, through your work and through your
9 residence, are you familiar with the wildlife in this
10 area?

11 A Yes, I am.

12 MR. MURPHY: I'd offer Mr. Gerber as an expert
13 in wildlife management.

14 MR. MURRAY: No objection.

15 CHAIRMAN CORKRAN: No objection. Proceed,
16 please.

17 BY MR. MURPHY:

18 Q Mr. Gerber, would you explain briefly to the
19 commission what the significance of the area is from the
20 wildlife standpoint.

21 A Well, the Chester River in this area is a



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1 historic migratory and wintering ground for waterfowl,
2 specifically Canada geese. For instance, last year, the
3 Chester River had approximately 75,000 geese in the mid-
4 winter survey, which places it number one in terms of
5 Canada goose rivers in the State of Maryland. You can
6 look all this up. It's Larry Hyman's survey data. And
7 it's been that way historically. It's always been a
8 very good river for Canada geese and other waterfowl.

9 The Chester River also holds about a third of
10 Maryland's black ducks, which as you all may know are
11 under a severe hunting restriction because they're
12 somewhat threatened at this point. I did my master's
13 thesis in this area of the Chester River on the black
14 duck, and it still holds about a third of the state's
15 wintering black duck population, surprisingly enough.

16 The area is also characterized by bald eagles,
17 any number of other migratory species of waterfowl, from
18 scaup to things we don't think about, like pie-billed
19 grebes and ruddy ducks, which have made the paper
20 recently, been associated with the dredging project, and
21 a lot of non-game species as well, such as ospreys and



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1 various shore birds and those sorts of things. So it's
2 a very rich and abundant and diverse wildlife area.

3 Q Now, with regard to the site specifically, the
4 700-acre tract where the golf course is proposed, would
5 there be anything you could say about that tract insofar
6 as wildlife are concerned?

7 A It's a very good wildlife site. If all the
8 farms on the Eastern Shore and Maryland or on the
9 Chesapeake Bay watershed had about 300 acres of open
10 space and about 400 acres of woodland, we probably all
11 wouldn't be sitting here right now. Just the fact that
12 it's roughly half wooded and half agricultural land
13 makes it valuable as wildlife habitat just in itself,
14 because there is that 50/50 mix that is good for
15 wildlife.

16 Q If I asked you, aren't all the areas of the
17 Eastern Shore rich with wildlife, and isn't that
18 something you have to be concerned with in every area
19 just the same?

20 A Well, some sites, you have to be more
21 concerned about than others. The area offshore of this



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1 site is a very good area for tundra swans and Canada
2 geese, as I mentioned before, and the fact that it's in
3 the critical area and has all this woodland associated
4 with it just makes it that much better for other
5 species, such as great horned owls and barn owls and
6 warblers and species that we typically don't even think
7 about in wildlife management, that we're just starting
8 to think about.

9 Q Do you have any concerns about the effect of
10 the golf course on wildlife?

11 A I do, mostly specific to human disturbance.
12 There's certain species, like bald eagles and black
13 ducks, that while you can plant corn and drive a tractor
14 up to them and that sort of thing, it doesn't bother
15 them in the least. When you have a lot of people,
16 40,000 people a year proposed here, very disturbing to
17 some species of wildlife, doesn't bother other species.
18 You can go through a list, and it bothers bald eagles,
19 bothers black ducks. Some other species of wildlife,
20 bluebirds possibly, and things of that nature, aren't
21 disturbed by people that much.



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1 But my chief concern here is the Canada goose
2 population. As we all know, the Canada goose population
3 in Maryland has been falling drastically in the last
4 five years or so due to two factors. Number one,
5 there's obviously been some excess mortality, but
6 there's also been a loss of habitat; and one of the
7 problems I see associated with the golf course is that
8 it's sort of a double-edged sword effect. If the area
9 is attractive to geese, which it will be because it will
10 be turf grass, and the farm is used by Canada geese
11 presently, you'll have a situation where those geese are
12 going to do a lot of damage to the fairways. That's
13 well documented in the scientific literature. It's just
14 a problem -- there's a problem with geese and golf
15 courses. That being the case, whoever owns and runs the
16 golf course is going to have a decision to make. Do
17 they discourage geese from using the golf course, so
18 they don't cause the damage to the fairways every year,
19 which could run into the tens of thousands of dollars,
20 as has happened at the Talbot Country Club in Talbot
21 County. If they discourage geese from using the golf



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1 course, then the geese have lost another 300 acres of
2 potential habitat. If they attract geese to the site
3 and continue to use chemicals like Diazinon, Duraspan,
4 Phenthion, some of the other chemicals in the literature
5 that have caused bird deaths, then we could have a goose
6 die-off.

7 So it's sort of a "catch-22" situation. If we
8 really enhance it for geese, which it could be enhanced
9 with the greens, the extensive grass fairways, the
10 ponds, make it attractive to them, there's a chance it
11 will lure them into a death trap. If, by the same
12 token, we said okay, we might have a problem here with
13 the poisons and we discourage them, the geese have lost
14 200 acres of habitat and will force them elsewhere.

15 Q How is the situation different from farm
16 fields, and specifically with respect to this concept of
17 monoculture?

18 A The term "monoculture" means you're trying to
19 raise one thing all the time. If you raise continuous
20 corn on a farm, you'll have to use granular Furodan.
21 You all probably remember for the past couple years in



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1 the paper there's been a pretty big deal made about
2 granular Furodan killing bald eagles around the
3 Chesapeake Bay. If you try to raise turf grass
4 consistently, you don't break it up with a corn or a soy-
5 bean rotation. You're going to develop insect problems,
6 and the only way to deal with those insect problems is
7 to use insecticides, which are a big problem for birds.
8 They're such a big problem for birds that New York State
9 now has a special 800 number established that people can
10 call when they see bird deaths, especially associated
11 with golf courses and other turf grass areas.

12 Q So what you're saying is that there is a
13 different problem presented by golf courses than by --

14 A Right. As a farmer, you can break up, if you
15 have a problem -- traditionally, you rotate your crops.
16 That's the best method of dealing with pest problems.
17 You raise corn one year. The next year you raise soy-
18 beans. You flip-flop those back and forth,
19 traditionally. You raise some winter wheat every second
20 or third year; and, if you have another problem with
21 maybe Johnson grass, you go to pasture for a couple



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1 years. There are all sorts of ways of breaking up
2 various insect and weed cycles in a conventional
3 agricultural system that you do not have when you say,
4 "Okay, we have to have turf grass here," especially
5 American type golf courses where American golfers --
6 they want to see green grass, and they want to see it
7 mowed. In some European countries, roughs are really
8 rough, and there's heather and bracken and those sorts
9 of things. In this country, golfers want to see short,
10 clipped grass, which is a very difficult thing to do
11 without using chemicals. It's impossible, I would say.

12 MR. MURPHY: That's all I have.

13 CHAIRMAN CORKRAN: Thank you. Mr. Murray.

14 CROSS-EXAMINATION

15 BY MR. MURRAY:

16 Q Mr. Gerber, your expertise in golf course
17 management, how deep does that go?

18 A Not extremely deep. It goes only deep enough
19 to know that they are consistently turf grass, and the
20 literature is replete with examples of bird die-offs on
21 golf courses.



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1 Q I think you've heard all the testimony about
2 this integrated pest management program.

3 A Right, right.

4 Q Assuming that one means what one says and does
5 one's best, do you see that as being substantially
6 mitigating the kind of concerns that you have?

7 A No, again, because of the amount of chemicals
8 necessary to produce a traditional American golf course.
9 If this was going to be called "The Weedy Queenstown
10 Golf Links" and we weren't going to worry about brown
11 patches and that sort of thing, that might be one
12 factor; but you have to understand that a farmer is only
13 making in this day and age 100 to 200 dollars an acre
14 raising corn and soybeans, and that's a good year.

15 So, with that to work with, a farmer just
16 can't afford to go out there and spray for mosquitoes.
17 He can only afford to spray so much for spider mites or
18 corn ear worm or anything of that nature. When you're
19 talking about making several hundred thousand dollars a
20 year or more on the golf course, your financial
21 resources are much greater. You have a greater risk,



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1 obviously, if you spent \$5,000,000 to establish it, and
2 you have to protect that investment; and the way to do
3 that as far as keeping your turf grass healthy is
4 insecticides, fungicides, herbicides.

5 Q Do you have personal experience with the
6 management of golf course turf grass?

7 A No, I do not. All I know is what I read in
8 the scientific literature.

9 Q The use of herbicides and fertilizers and
10 fungicides, and so on and so forth, it's the surface
11 availability of those things to animals that most
12 concerns you?

13 A No. There are examples, if you spray a golf
14 course, let's say, for grubs or something of that
15 nature. Many times -- and this can happen on lawns as
16 well -- the insects will crawl out of the ground and die
17 and then be available for bird consumption. So it's not
18 just the surface application. It's also the -- Richard
19 testified at length about pesticides leaching into
20 ground water; and, in the interest of brevity, I won't
21 get back into that, but it's not just the surface



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1 application. It's the total range of impact.

2 Q Well, the business of killing worms or grubs,
3 I guess you call them, is that unique to a golf course?

4 A Not necessarily.

5 Q Is that the sort of thing that's ever done in
6 agriculture?

7 A Certainly. That's one of the reasons Furodan
8 is used to kill some sorts of worms; but, again, proper
9 rotation can deal with that. There's not that
10 opportunity on a golf course.

11 Q How much experience do you have in golf course
12 turf management?

13 A Again, review the scientific literature and
14 talking to, you know, people that are involved in golf
15 courses.

16 Q In terms of the reduction in habitat for
17 wintering geese --

18 A Right.

19 Q -- why is that necessarily a problem? Are
20 they short of food and land in the Chester River area
21 now?



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1 A They are short of areas where they are not
2 heavily hunted, where food, that sort of thing, is
3 available to them. My understanding is, at present,
4 that Lord's Gift isn't heavily hunted, and that makes
5 the area attractive to them. That's one of the reasons
6 they sit offshore there all the time. They're not
7 harassed.

8 Q My Lord's Gift is not presently hunted
9 presumably because that's the owner's wishes?

10 A I don't have the foggiest idea about that.

11 Q Well, do you know any other reason it would
12 be?

13 A No. That's probably why, it's the owner's
14 wishes, sure.

15 Q It may be that the geese could find other
16 farms that the owners didn't allow hunting on?

17 A No. We have an extensive sanctuary program,
18 and I have a pretty good feel for who hunts what, where
19 and how often, you know, and I really feel that habitat
20 is -- wintering habitat is a limiting factor to Canada
21 geese, among other migratory birds.



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1 Q In terms of the current owners' use of their
2 land, though, they could, if they wanted to, allow
3 commercial hunting to go on aggressively?

4 A Surely.

5 Q And that would at least have as bad if not a
6 worse impact on the geese?

7 A Well, again, the hunting season only lasts so
8 long. So those geese might be driven off the farm.
9 It's typical to see a farm that's good for geese. Where
10 the goose season lasts 50 days this year, that 50 days
11 the geese aren't going to touch the place; but, when the
12 season is over, they'll be back in there. But, if we
13 have a golf course manager who is -- you know, a candle
14 is being held to his feet about keeping the fairways in
15 good shape, and the geese destroy these fairways, then
16 we're going to have a problem. Somebody is going to
17 have to make a difficult decision.

18 Q You indicated that there were tens of
19 thousands of dollars of goose damage at Talbot Country
20 Club. Where did you get that information?

21 A From a member of the club, who was in charge



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1 of the committee.

2 Q And was that in a single year or over a period
3 of many years?

4 A It was over \$10,000 in a single year.

5 Q And what kind of damage was it?

6 A It was damage to the fairways, my
7 understanding. That's principally -- they don't damage
8 the greens as much because they're clipped so close and
9 that sort of thing, but the fairways apparently were
10 where a lot of damage was done.

11 Q Did you read the best management --

12 A Yes, I did.

13 Q -- section of the application? And you're
14 familiar with the intent to aerate and dethatch the golf
15 course?

16 A (Nods head affirmatively.) I would suggest
17 here that the commission strongly consider talking to
18 Dr. Ward Stone, who's one of the gurus of turf grass and
19 insecticides. I think the Chesapeake Bay deserves that.
20 He's a very knowledgeable person in New York. I realize
21 there are a lot of good intentions here, and I think



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1 certainly we all could benefit from him being talked to
2 by the commission staff or what have you. He
3 certainly has the expertise that I lack in turf grass
4 management.

5 MR. MURRAY: That's all I have. Thank you.

6 CHAIRMAN CORKRAN: All right. Thank you.
7 Thank you, Mr. Gerber.

8 MR. MURPHY: I have another witness then,
9 Mr. Wood.

10 MR. WOOD: My name is Howard Wood.
11 Whereupon,

12 HOWARD WOOD,
13 a witness, called for examination by counsel for the
14 Protestants, was duly sworn, and was examined and
15 testified as follows:

16 DIRECT EXAMINATION

17 BY MR. MURPHY:

18 Q Mr. Wood, you're a member of the bar and
19 practice in Centreville; is that correct?

20 A Well, I'm no longer really active, but I have
21 practiced here. That's been my career.



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1 Q As a lawyer in Centreville?

2 A Yes.

3 Q And you also serve with an organization
4 protecting the Chester River; is that correct?

5 A Yes.

6 Q What is the name of that organization?

7 A I serve on the boards of the Chester River
8 Association, Queen Anne Conservation Association,
9 Wildfowl Trust of North America, and also the Maryland
10 Environmental Trust. I'm the treasurer of that trust.

11 Q And are you speaking today on behalf of any of
12 those organizations?

13 A I'm speaking primarily on behalf of the
14 Maryland Environmental Trust.

15 Q I see. And what do you wish to tell the
16 commission with respect to the golf course?

17 A Well, two weeks ago today, on the 7th of May,
18 at the regular board meeting of the trust, I brought up
19 the subject of this application for this golf course at
20 My Lord's Gift, and the trust had already heard over the
21 past several years the prior proposal of the developer



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1 for the inn and the guest houses and the golf course and
2 had -- various members, various trustees, expressed a
3 lot of concern over the years about the use of this
4 particular property in this location, which they
5 consider one of the most sensitive areas and one of the
6 most scenic rivers on the East Coast, to be a very
7 worrisome matter, that until they knew more about it,
8 they weren't going to go on record. But, two weeks ago,
9 I told them what I knew about it; and, as a result, they
10 voted -- every one of them present voted to ask me to
11 come here and express the opposition of the trust to
12 this proposal.

13 Q What is the reason for that opposition?

14 A Well, the reasons were, more or less, the same
15 list of real concerns that have been brought out here
16 this afternoon, primarily the threat of nitrogen to the
17 ground water, the threat of sediment run-off from
18 construction, the threat of danger to the wildfowl, to
19 the wildlife, particularly wildfowl, and almost
20 primarily the threat of such intense additional human
21 activity here to the wildlife habitat.



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1 MR. MURPHY: That's all I have.

2 MR. MURRAY: No questions.

3 CHAIRMAN CORKRAN: No questions? Thank you.

4 Just a minute.

5 MR. DEMING: This is a good time to get this
6 in.

7 CHAIRMAN CORKRAN: Okay.

8 MR. DEMING: One of the letters that has been
9 received by Judge North, chairman of the commission, is
10 a letter from the Maryland Environmental Trust,
11 basically stating their position. We were going to
12 attend to these letters when Ren Serey testified, but
13 why don't we do it now, and then we can just get this
14 one in.

15 CHAIRMAN CORKRAN: Okay.

16 MR. MURPHY: I haven't seen it.

17 MR. DEMING: I have another copy.

18 MR. MURRAY: I suspect -- I know that the
19 commission is going to accept this over my objection,
20 but at least let me say it for the record. This is the
21 kind of unprincipled pot shots that anybody can take.



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1 Half of this letter is made up of attacking an inn,
2 which is not part of this concept and hasn't been for a
3 long time. Part of this letter says that -- this is
4 something interesting -- "Many landowners on the
5 Chester River would put their properties into trusts if
6 this project doesn't go forward." That's an easy
7 allegation to make and a very interesting one. These
8 people are serious about those kinds of things, and they
9 want to make real contributions to the environment.

10 What difference does it make what happens to
11 this property? If they want to do something good, let's
12 do it.

13 MR. MURPHY: Is this a speech from Mr. Murray?

14 MR. MURRAY: It's an objection.

15 CHAIRMAN CORKRAN: We note the objection.
16 We'll accept it.

17 (Whereupon, the document was marked for
18 identification Protestants' Exhibit No. ? and received in
19 evidence.)

20 CHAIRMAN CORKRAN: Mr. Murphy.

21 MR. MURPHY: Mr. Carroll.



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1 MR. CARROLL: Am I already sworn in, or do you
2 want to do it again?

3 MR. MURPHY: I guess you'd better do it again.

4 MR. CARROLL: My name is John Carroll.

5

6

7 Whereupon,

8

9 JOHN CARROLL,
10 a witness, called for examination by counsel for the
11 Protestants, was duly sworn, and was examined and
12 testified as follows:

13

DIRECT EXAMINATION

14

BY MR. MURPHY:

15 Q Mr. Carroll, Mr. Murray just made a reference
16 to a statement in the letter from the trust about the
17 willingness of property owners to protect their land
18 through easements. Do you have knowledge with respect
19 to that?

20 A Yes, I do.

21 Q Would you explain that to the commission,
please.



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1 A Well, this deals with the people who live
2 outside of Queenstown, of which I'm one. There are
3 really three principal owners right on the creek who
4 would be very seriously affected by a further
5 deterioration of the water quality of the creek. As I
6 guess I pointed out in my initial testimony, really our
7 lives here on farms -- we depend on wildlife for our
8 enjoyment both in the water and in the fields and in the
9 woods and so on. That is our life.

10 All of us are concerned about the increased
11 commerciality which this golf course will bring. I know
12 they've only said they want a golf course, they only
13 want a golf course, but still they refuse to give up
14 their right to have houses and water access, to have
15 commercial activity on the creek.

16 Now, three of the owners, myself, Mr. Dudley
17 and the Stevens estate, have declared that we would
18 renounce by easement any commercial activity whatsoever
19 having to do with the creek, provided the Birney
20 interest would do the same.

21 In addition to that, others of us have gone



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1 further and said, if this question could be resolved
2 without further -- without the addition of further
3 commercial activity, that we would put easements on our
4 property above and beyond that, that we would see to it
5 that they would remain as farms in perpetuity. Now, the
6 people who are interested in doing that would be not
7 people who are directly on the creek, but people who are
8 concerned about what happens to them if the creekside
9 properties go commercial. So they have thrown in their
10 lot.

11 In addition to that, there are a number of
12 easements in this stretch already given, and the three
13 or four that remain would provide a stretch of -- I
14 guess it's 15 miles in the Chester River in a very
15 strategic area opposite the Chesapeake Wildlife Refuge
16 -- Eastern Neck Wildlife Refuge. I have a picture of
17 it. I think if I show that map --

18 Q Sure. Why don't you get that out.

19 MR. MURRAY: Mr. Chairman, while Mr. Carroll
20 is looking --

21 THE WITNESS: I'm afraid it's only one copy.



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1 MR. MURRAY: -- I'd like to make an objection.

2 CHAIRMAN CORKRAN: That's all right.

3 MR. MURRAY: This hearing has to do with a
4 proposal for a golf course. I'm not aware of any
5 authority for the commission to condition its decision
6 one way or the other on whether nearby landowners
7 prefer the use to be agriculture or something else or
8 whether they are willing to make some sort of a
9 restriction on their own land if a golf course or some
10 other facility is not approved.

11 It seems to me that this is in the nature of a
12 private offer. Either this is grandstanding and it
13 hasn't got anything to do with the essential point that
14 is trying to be made, that is, that other people care
15 about the Chester River, or if it's sincere, it has no
16 place at this commission hearing. This commission has
17 no authority to impose or condition its actions on
18 whether or not this current landowner agrees with or
19 cooperates with other landowners who want to put
20 voluntary restrictions on their property.

21 I submit to you this whole line of testimony



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1 is out of place and it has no probative relationship to
2 anything before you.

3 MR. MURPHY: Mr. Chairman, I'd like to respond
4 to that, if I may.

5 CHAIRMAN CORKRAN: Okay.

6 MR. MURPHY: We find ourselves in the unusual
7 situation of the commission approving or disapproving
8 this golf course, as the chairman says. So you're
9 really in the position of attempting to follow the
10 criteria here in the regulations. One of the specific
11 criteria stated in these regulations under resource
12 conservation area is, "Agricultural and conservation
13 easements shall be promoted in resource conservation
14 areas." That's a specific criteria.

15 I'm just showing you the willingness of the
16 landowners in the area to restrict their land to
17 satisfy that very purpose. I'm not saying that you have
18 to do anything as a result of this, but I'm just saying
19 it's a relevant circumstance. It's hardly a foreign
20 matter to your decision. It's the same as water quality
21 and all the other thing. It's written right in the



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1 regulations.

2 CHAIRMAN CORKRAN: We'll note your objection
3 to this, but we will accept that, sir.

4 MR. MURRAY: Thank you.

5 BY MR. MURPHY:

6 Q Would you just explain, Mr. Carroll, utilizing
7 that map where these easements are, where these
8 properties are, and --

9 A This property down here is Mr. Dudley.

10 Q How many acres is that?

11 A That's approximately 100 acres. The property
12 next to it -- I'm going all the way up to this part --
13 along the east shore of the creek belongs to the Stevens
14 estate.

15 Q Excuse me. How many acres is that
16 approximately?

17 A About 626 acres. This property -- part of
18 this neck here belongs to me and my family, and that's
19 300 acres. A portion of it belongs to Mrs. Clarence
20 Miles, and that is about 295 acres. Then a portion here
21 belongs to Mr. Lawrence Hoyle, and that is 392 acres.



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1 North of them is The Hermitage, which is an historic
2 property, probably the oldest property in Maryland still
3 in the hands of the same family. They have already put
4 an easement on all of the immediate farm area.

5 Q That's the Tilghman property?

6 A That's the Tilghman property.

7 Q North of the Tilghmans is the Ferguson
8 property, and there's two or three smaller properties,
9 Mr. Dobbin here. I forget the other one, and then
10 Mr. Smith. That's Mr. Wood's property there. Two other
11 easements given on Eastern Neck proper, I don't know who
12 they belong to. This is the Eastern Neck Wildlife
13 Refuge. Down here we have Mrs. Nesbitt's 300 -- I think
14 it's 380 acres; and Mrs. Caputto, 390 acres. This is
15 My Lord's Gift.

16 Q Nesbitt and Caputto, are they both in the
17 Environmental Trust?

18 A Yes. They've already given easements to the
19 Environmental Trust.

20 MR. GRIFFIN: Everything in green is already
21 eased; right?



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1 THE WITNESS: In Queenstown and just outside
2 it, there is an easement on the house, Bollingley, which
3 is not with the Maryland Environmental Trust, but with
4 the National Trust for Historic Preservation; and that
5 includes an 80-acre tract just outside Queenstown.

6 BY MR. MURPHY:

7 Q What is the total amount of uneased property
8 that would be willing to go into the easement program?

9 A About 1,600 acres.

10 Q Then if you add the easement properties,
11 already eased properties on top of that, what is that
12 total?

13 A Gosh, I don't know. I don't know.

14 Q Tilghman's --

15 A It would be very large. Tilghman is over
16 1,000 acres, and so is Ferguson.

17 Q And you say this is approximately 16 miles up
18 and down the Chester River?

19 A I think it's 16 miles, we measured 16 miles.
20 It depends how you measure it. If you go in and out of
21 every inlet, that would be one thing.



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1 MR. MURPHY: I would offer this into evidence,
2 please.

3 CHAIRMAN CORKRAN: Okay, fine.

4 (Whereupon, the document was marked for
5 identification Protestants' Exhibit No. ? and received
6 in evidence.)

7 BY MR. MURPHY:

8 Q Mr. Carroll, you've been involved with this
9 project for four or five years; is that correct?

10 A I first became aware of it in 1985 when a
11 hotel and 100 boat slips were proposed.

12 Q And I'll hand you this document and ask you if
13 you can identify it.

14 A Yes. That's a brochure that was put out for
15 a more recent plan of Washington Brick's, this time for
16 an 18 -- no, a 27-hole golf course, tennis courts, a
17 hotel, and I think 22 boat slips, if I'm not mistaken.
18 At this point, the hotel had been moved to a different
19 location.

20 Q Was that in approximately 1989 that plan was
21 developed?



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1 A I think so, 1988 or '89.

2 MR. MURPHY: I would offer this into evidence,
3 not to show that this is a hotel being proposed now, but
4 to show that it's been proposed in the past by these
5 same people.

6 MR. MURRAY: My guess is that Lex Birney,
7 Charlie Birney and their father and their mother and
8 their grandparents and their great-grandparents and
9 probably more relatives that we could count have thought
10 about doing different things in their lifetime, and it
11 has no more to do with this hearing today than this
12 piece of paper. I repeat, this doesn't belong before
13 this commission. None of it does.

14 MR. MURPHY: I would offer it in evidence.

15 CHAIRMAN CORKRAN: Okay. We'll sustain the
16 objection there on that, because it's already a part of
17 the record in the past. The commission has it.

18 MR. MURPHY: All right. Let me ask -- the
19 commission has this in its files?

20 MR. DEMING: No.

21 CHAIRMAN CORKRAN: Don't they?



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1 MR. DEMING: No. I conferred with the
2 chairman and told him that the history of what had been
3 proposed previously was already a matter of record in
4 the earlier transcript on April 23.

5 MR. MURPHY: Well, I mean, this is just some
6 tangible evidence of it. It's a picture and --

7 CHAIRMAN CORKRAN: Well, let's sustain the
8 objection.

9 BY MR. MURPHY:

10 Q Mr. Carroll, do you have a concern about the
11 future development of this property?

12 A Yes, I do.

13 Q And what is that concern?

14 A Well, the concern is that, as Mr. Kutcher
15 pointed out very early on, one type of commercial
16 activity leads to another; and, in this world of rapidly
17 changing regulations, there will be, off the bat, a lot
18 of people who would want to take advantage of that flow,
19 of that flow of tourists. They will be opening other
20 activities. They'll sell them hamburgers, they'll sell
21 them popcorn, and there will be a press in the area to



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1 commercialize it.

2 I reiterate that this began with a hotel and
3 100 boat slips. Although the applicants have --
4 although they say now that they don't intend any such
5 further activities, they refuse to give up any rights to
6 have those activities in the future. I think that
7 access by water is a particularly problematic thing.

8 One thing, that Queenstown Creek which as
9 we've, I hope, demonstrated, doesn't flush. One thing
10 that it really can't stand is large numbers of boaters
11 from Annapolis and Baltimore inhabiting those waters on
12 a continual basis and being brought to the golf course
13 by launch and things like that. This is something that
14 was proposed when that original golf course and inn was
15 proposed.

16 MR. MURPHY: That's all I have.

17 CHAIRMAN CORKRAN: Okay. Thank you.

18 CROSS-EXAMINATION

19 BY MR. MURRAY:

20 Q Mr. Carroll, to clarify, the individuals who
21 you contend are only awaiting the decision of this panel



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1 to give thousands of acres of land to the Environmental
2 Trust, who are they?

3 A Well, they're myself and Mrs. Miles and
4 Lawrence Hoyle. The Stevens' situation is not known at
5 this time because of the death of Mrs. Stevens.
6 Mr. Dudley has committed to a non-use of the creek for
7 commercial purposes. All of those people have committed
8 to that. Some of us are willing to go further and grant
9 substantial easements beyond that.

10 Q Mr. Dudley, in fact, has no objection to the
11 golf course, does he?

12 A Mr. Dudley is vitally concerned about the
13 commercialization of the creek. He feels that if this
14 were to be a golf course, nothing but a golf course, he
15 would have no objection to it. I gather you have a
16 letter there that says he's not -- doesn't object to the
17 golf course environmentally. I think he hasn't been to
18 hearings like this one and might change his mind, but
19 his major concern is the commercialization of the creek,
20 and that's why he made that commitment.

21 Q So, instead of saying, as I thought I heard



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1 you say, that he would make a commitment to subject his
2 land to an environmental trust if the golf course
3 weren't developed, in fact, his commitment is related to
4 an inn project or a marina or some other water-related
5 commercial activity, which isn't before this panel?

6 A If the Birneys would restrict water access, he
7 would do the same. We would all do the same. I'm
8 certain that Mr. Dudley would restrict his property on
9 the Queenstown Creek to the same degree that the Birney
10 family did.

11 Q Are you speaking on behalf of Mr. Dudley and
12 saying that, if the Birneys agreed that Mr. Dudley would
13 not be able to drive his boat up to their dock and make
14 use of the golf course, that that would make a
15 difference in his judgment as to whether or not to
16 subject his land to an environmental easement?

17 A I got lost along there. Could you repeat
18 that.

19 Q Yes. You indicated, as I understand it, that
20 it's not the golf course that is the source of the
21 concern, it is other commercial-related waterfront



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1 activities.

2 A That concerns Mr. Dudley?

3 Q Yes.

4 MR. MURPHY: Is this a question?

5 MR. MURRAY: Yes.

6 THE WITNESS: Well, I tell you what, I have a
7 letter in my files there from Mr. Dudley. Maybe I could
8 read that.

9 MR. MURRAY: By all means, to help us clarify
10 things.

11 THE WITNESS: This says in part -- this is a
12 letter to the Town Commissioners. Oh, it isn't signed,
13 but the letter that accompanies it was signed. Anyway,
14 "Gentlemen, I am still thoroughly convinced, as I have
15 repeatedly stated, that every effort should be made to
16 preserve the residential character of Queenstown Creek.
17 Any commercial encroachment of that, no matter how
18 tastefully done, can only mark the beginning. Once such
19 a change is initiated, it is impossible to stop."

20 He goes on to talk about where the commercial
21 growth of the town should be. Then he says, "At this



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1 point, I am pleased to inform you that three owners of
2 creek frontage, Carroll, Stevens and myself, have agreed
3 to restrict those properties to no commercial use,
4 provided every other owner along the creek would agree
5 to the same limitation. This could be accomplished by
6 deed of easement."

7 BY MR. MURRAY:

8 Q What's the date of that letter?

9 A This is September 22, 1989.

10 Q Are you familiar with Mr. Dudley's letter to
11 the chairman of the Critical Areas Commission, dated
12 March 28, 1990, in which he says he has no objection to
13 the golf course?

14 A I'm not familiar with it.

15 MR. MURPHY: I think you ought to read it.

16 Let the witness read it.

17 MR. MURRAY: I agree.

18 THE WITNESS: Do you want me to read it aloud,
19 or what do you want me to do?

20 MR. MURPHY: Just read it.

21 BY MR. MURRAY:



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1 Q No, I just wanted to ask you if you are
2 familiar with it and the fact that in that letter he
3 says he's not opposed to the golf course.

4 A Well, I wish he were here to speak for
5 himself.

6 Q So do I.

7 A I can't say what goes on in Mr. Dudley's mind.
8 I know that he is very concerned about commercial
9 development in the creek. He may feel, and I think he
10 does feel, that a golf course might be a preferable
11 alternative to having, I think you said, 81 houses out
12 there; and I think he may be under the impression that
13 that's how many houses could be built out there, and he
14 may see the golf course as preferable to that.

15 I'm quite sure, however, that, as long as I'm
16 speaking for him, that he would not like to see a golf
17 course and a whole lot of houses.

18 Q Did you state that the Caputtos are opposed to
19 the golf course project?

20 A Well, Mrs. Caputto told me that she was
21 opposed. She's very concerned about the water supply,



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1 among other things.

2 Q When did you talk to her about that?

3 A Maybe three or four weeks ago.

4 Q I gather then that this letter will come as a
5 surprise to you.

6 A I guess it will. It comes as a surprise.

7 MR. MURRAY: This is a letter from Mr. and
8 Mrs. Caputto to Arthur Birney, dated April 27, 1990, in
9 which they indicate they have no objection to the golf
10 course. In view of the fact that there's been testimony
11 from Mr. Carroll stating what he thought the Caputtos
12 felt, I'd like to have this admitted, at least to offer
13 another view that they apparently had at one time.

14 CHAIRMAN CORKRAN: We accept that.

15 THE WITNESS: What is the date of that letter,
16 please.

17 CHAIRMAN CORKRAN: April 27, 1990.

18 (Whereupon, the document was marked for
19 identification Protestants' Exhibit No. ? and received
20 in evidence.)

21 BY MR. MURRAY:



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1 Q Mr. Carroll, your property has how many acres?

2 A Three hundred.

3 Q Three hundred. And how many building lots are
4 on there?

5 A Oh, I see what -- oh, I know what you -- yes,
6 periodically, we give away to the children's land trust
7 pieces of the property. So not all of it is owned by
8 myself.

9 Q There are six legally identified parcels
10 there.

11 A Yeah. They're owned by the Carroll Children's
12 Land Trust, whose trustee is my brother Phillip Carroll.

13 Q And those parcels were subdivided at or after
14 the time you acquired the property?

15 A All but one of them.

16 Q You have an ongoing farming practice?

17 A Yes.

18 Q Do you use best management practices on the
19 farm?

20 A Try to.

21 Q Is it an approved best management plan?



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1 A I'm not sure. Well, we're trying to really
2 upgrade it at the present time, and I'm not sure just
3 where we stand with that. We do have a buffer around
4 the property that goes into the creek or into any
5 streams. We do have that, a 50-foot buffer, and we're
6 attempting to experiment with new crops in breaking the
7 cycle, as Ed Gerber spoke about.

8 Q Have you got any problems with your septic
9 system?

10 MR. MURPHY: I guess I really should object to
11 this. I don't know what Mr. Carroll's septic system has
12 to do with the approval of the other property. I think
13 this is really harassing the witness. I object.

14 MR. MURRAY: The last thing I wish to do is
15 harass any witness, but Mr. Carroll, it seems to me, has
16 made an issue in this case of the environmental
17 condition of Queenstown Creek and surrounding
18 environments. He attempts, it seems to me, to seek to
19 hold my clients to a standard that exceeds any that has
20 ever existed under law anywhere before, and I think it
21 is relevant for the commission to understand how



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1 Mr. Carroll in his own practices, in his own life, deals
2 with these very same issues, where he has 100 percent
3 control over.

4 MR. MURPHY: I object. I don't understand
5 what that has to do with Washington Brick and Terra
6 Cotta Company's approval or disapproval.

7 CHAIRMAN CORKRAN: We've decided we would
8 overrule the objection.

9 But let me call your attention that let us not
10 get into this kind of discussion. Let's direct our
11 efforts and our body and soul to the issue which is
12 before us. That's what we're here for. We're not here
13 for this kind of questioning in here. All right.

14 BY MR. MURPHY:

15 Q You can go ahead, sir.

16 A What was the question?

17 Q I'll withdraw the question.

18 Mr. Carroll, one of the concerns you expressed
19 had to do with the concern that additional or new, as
20 you've characterized it, commercial activity in the
21 neighborhood of Queenstown will somehow generate further



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1 commercial activity. Given that the, you know, the town
2 of Queenstown is an active, vital town, with a lot of
3 small businesses and has some large businesses, and
4 right outside of town you have 5301, and the Pottery and
5 Chesapeake Village, how do you believe that the golf
6 course would have a material impact on changing the
7 nature of the general area?

8 A Okay. I have some comments that were given to
9 me by some of the officials of the town of St. Michaels.
10 Could I refresh my recollection by referring to that
11 document?

12 Q Sure. Go ahead.

13 A These were comments made by officials of the
14 town of St. Michaels and other residents that I
15 collected over a period. One, "Very strong zoning laws
16 are required to begin with. Developers read the
17 ordinance before they announce their plans and they are
18 adept at taking advantage of weaknesses in the zoning
19 laws. If the town is to be kept residential, the
20 mechanisms to do so must be in place in advance.

21 Keeping developers in line is very costly and with a



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1 poorly drawn ordinance, a town will find itself
2 frequently in court. Mention was made of an example in
3 which a developer interpreted the hotel unit to mean a
4 five-room suite.

5 A town must be very astute about annexation.
6 When a property is annexed, the town is taking over the
7 entire responsibility for the facility, the sewage, the
8 water, and the responsibility for seeing to it that it
9 conforms to both state and local laws.

10 Waterfront communities are attractive to
11 developers, mainly because of the potential for
12 developing tourism as opposed to residential
13 development. Once tourism gets started, drastic changes
14 can take place, among them the following: A) Large
15 numbers of people arrive from New York, Pennsylvania and
16 elsewhere, all intent on opening stores, restaurants,
17 museums or other commercial activities. The constant
18 necessity of dealing with these people, most of whom do
19 not take up residence in the town, is expensive.
20 For nine months of the year, the residential life of the
21 town can be disrupted. Crowds have to be controlled



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1 and police patrolling has to be around the clock in the
2 summer months. A highly trained police force is needed;
3 in St. Michaels, this costs \$150,000 a year. Traffic
4 and parking become problems and the more restaurants
5 there are, the worse these get.

6 C) Noise becomes a problem. In addition to
7 the noise from restaurants and other commercial
8 activities, outdoor music is a particular irritant,
9 especially near the water because of the way noise
10 carries there. Noise ordinances have to be passed and
11 continually enforced.

12 D) Odors can proliferate and be offensive,
13 particularly sewage from the harbor.

14 E) Crowding in the harbor can be caused by
15 tour boats as well as pleasure boats. Tour boats from
16 as far away as New England work the area in increasingly
17 large numbers and one or two of these alone can stress a
18 town's facilities. Harbor management plans have to be
19 devised and enforced.

20 Without careful advance planning, water and
21 sewer can take on a whole new dimension of problems.



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1 Greatly increased peak water loads have to be met,
2 requiring both new wells and new storage. Sewage
3 facilities must be upgraded to the tertiary stage and,
4 even when this is done, there are problems, e.g., with
5 the chemicals from holding tanks.

6 Pollution of the harbor can be so severe as to
7 require the installation of aeration machines and this
8 has happened at St. Michaels. Most people are unaware
9 of the degree to which services have to be increased to
10 cope with the problems listed above. The expense of
11 these services can be considerably greater than the
12 revenue brought to the town.

13 Contrary to expectations, tourist activities
14 create relatively few jobs and these are mainly of the
15 seasonal minimum wage type. As a consequence, the
16 possibility of increased taxes can arise. St. Michaels
17 today runs a very tight ship with its professional staff
18 of five people and is uniquely fortunate in owning an
19 electric plant which brings substantial revenue.

20 All of those contacted emphasized the need for
21 very sophisticated zoning codes, in order to prevent



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1 tourism from taking over, to preserve residential values
2 and to permit waterfront towns to control their own
3 growth."

4 Gentlemen, this is what citizens for the
5 preservation of Queenstown Creek is all about and I'm
6 sorry that the grand status is complaining.

7 Q Mr. Carroll, you were here at the last day of
8 this hearing, correct?

9 A Yes.

10 Q First day of the hearing, which was our only
11 other one?

12 A (Nods head affirmatively.)

13 Q And you heard the testimony of the county
14 officials to the effect that they supported the project?

15 A I did.

16 Q Sometime back in '85, you made an effort to
17 buy the My Lord's Gift Farm, didn't you?

18 A No.

19 Q You never did?

20 A No. I made a proposal to Mr. Birney that I
21 might be able to find somebody -- that I might be able



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1 to find some way to buy his development rights. And
2 this was, I believe, 1986. Anyway, the problem became
3 that I couldn't find anybody who was willing to make an
4 appraisal of those development rights because the laws
5 were in such flux at the time that everybody said "Well,
6 how do I know what is going to happen? The Critical
7 Area rule is just coming in." The county was in the
8 midst of totally changing its master plan and nobody
9 would appraise it. So that failed as I couldn't attach
10 a value to anything. And without a value, I couldn't,
11 you know, organize my group.

12 Q So you deny that on June 22nd, 1985, in the
13 law offices of Elmer Thompson, that you asked Mr. Birney
14 to state a price for the sale of the farm?

15 A Let's see, that's a long time ago. He said
16 that he -- I don't remember how the conversation went
17 but he said that he had refused a price of \$8,000,000
18 for it and I had heard other evidence that this was not
19 the case. But I don't remember exactly what we said. I
20 didn't, certainly at that time, make an offer to buy.

21 And the proposal I did make to Mr. Birney was



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1 not in Queenstown, it was in his office in Washington,
2 somewhat later than that.

3 Q And that was the only time you ever had such a
4 conversation with Mr. Birney?

5 A Oh, I've only had two sit-down conversations
6 with Mr. Birney. One is the meeting you referred to, in
7 which I think Howard was present. Yeah. Maybe your
8 memory is good on that. The other was a meeting alone
9 with him in his office.

10 MR. MURRAY: Can I register an objection to
11 further explorations along this line. I mean I think
12 that it's clear what happened but it's clear that Mr.
13 Carroll has attempted, by various means, to preserve
14 this area, and I think that's on the record. And
15 whether you agree with that or not, that doesn't make
16 any difference.

17 MR. MURPHY: No further questions.

18 CHAIRMAN CORKRAN: You have no further
19 questions.

20 Let's give our reporter a little rest here. I
21 think --



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1 MR. MURRAY: Could I just ask him one
2 question --

3 CHAIRMAN CORKRAN: Sure.

4 MR. MURRAY: -- just before we stop?

5 CHAIRMAN CORKRAN: Oh, sure. Excuse me.

6 MR. MURRAY: All right. Two questions.

7 RECROSS-EXAMINATION

8 BY MR. MURRAY:

9 Q Does the town of Queenstown, right now, have a
10 planning staff, and planning director, and zoning
11 inspector, and zoning administrator and all the
12 apparatus of a municipal government?

13 A No.

14 Q Mr. Dudley, is he a real estate appraiser?

15 A Yes, he is.

16 Q Does he have, in fact, the MAI
17 qualification?

18 A Yes, he does and quite proud of it.

19 Q Thank you.

20 MR. MURPHY: That's all I have.

21 CHAIRMAN CORKRAN: We'll take a five-minute



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1 break.

2 (Whereupon, there was a brief recess.)

3 CHAIRMAN CORKRAN: We're back on the
4 record.

5 Are you ready, Mr. Murphy?

6 MR. MURPHY: Mrs. Tolliver.

7 Whereupon,

8 MRS. TOLLIVER,
9 a witness, called for examination by counsel for
10 Citizens for Preservation, was duly sworn, and was
11 examined and testified as follows:

12 DIRECT EXAMINATION

13 BY MR. MURPHY:

14 Q Mrs. Tolliver, can you identify this letter?

15 A Yes. This is the letter that the planning
16 commission wrote to Judge North about this project.

17 Q And you're a member of the planning
18 commission?

19 A I am a member of the planning commission.

20 Q And it's signed by Mr. Dudley and by you?

21 A Yes. We are co-chairmen.



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1 Q Co-chairpersons.

2 A Co-chairpersons.

3 MR. MURPHY: In the interest of time, I'm just
4 going to submit this letter. She's identified it. I've
5 given a copy to Mr. Murray.

6 CHAIRMAN CORKRAN: All right.

7 MR. MURRAY: No objection.

8 CHAIRMAN CORKRAN: No objection.

9 (Whereupon, the above-entitled document
10 was entered.)

11 MR. MURPHY: I would just note that the letter
12 says that "We are unanimously opposed to any
13 commercialization of Queenstown Creek now or in the
14 future. If the commission is disposed to approve this
15 proposal, we suggest it condition its approval upon
16 requirements that there be no water dependent uses or
17 uses having access to the Queenstown Creek."

18 BY MR. MURPHY:

19 Q Now Mrs. Tolliver, I want to ask you Mr.
20 Dudley is your co-chairperson; is that right?

21 A That's right.



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1 Q And did he also write a letter himself?

2 A Yes, he did.

3 Q Can you identify this letter?

4 A Yes. He sent me a copy of this.

5 MR. MURPHY: And I don't think this has been
6 introduced. I would offer this. This is a letter of
7 March 28, 19 --

8 MR. MURRAY: The one we talked about earlier.

9 MR. MURPHY: -- 90?

10 MR. MURRAY: Yes.

11 THE WITNESS: That's the same one.

12 MR. MURPHY: I would offer this.

13 MR. MURRAY: No objection.

14 CHAIRMAN CORKRAN: No objection.

15 (Whereupon, the above-entitled document
16 was entered.)

17 MR. MURPHY: And I would point out something
18 in the letter. It's been characterized before as saying
19 that Mr. Dudley has no objection to the golf course.
20 But Mr. Carroll identified Mr. Dudley as a real estate
21 appraiser and, as a matter of fact, an MAI. And I'll



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1 just read the second paragraph of this letter:

2 "I am not against a golf course per se or even
3 the inn, for that matter, if it were located on the
4 river where it should be. My primary concern, and that
5 of everyone to whom I have talked, is the effect of
6 these commercial projects --" plural, "-- by Queenstown
7 Creek." This is Mr. Dudley identifying the golf course
8 as a commercial project.

9 MR. MURRAY: May I be heard?

10 CHAIRMAN CORKRAN: Oh, sure.

11 MR. MURRAY: One of the limiting factors of
12 looking at a document is that if you don't read the
13 whole thing, you hear or see things out of context. If
14 I may, I'd like to put what Mr. Murphy just said in
15 context, very briefly.

16 Mr. Dudley, in his letter, goes on to say "It
17 would seem to me that a golf course might be an ideal
18 use for critical area land." He goes on to talk about
19 golf courses related to inns and the boating traffic
20 that might be affiliated with that. But then he says
21 "If this potential problem --" that is the boating



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1 issue, "-- can be controlled, then I can find no basis
2 for objection to the entire project."

3 So I think that what I said earlier, in
4 characterizing this letter, is perfectly accurate.

5 MR. MURPHY: All right. I have some other
6 documents --

7 Thank you, Mrs. Tolliver.

8 CHAIRMAN CORKRAN: Thank you.

9 MR. MURPHY: -- that I wish to introduce. Two
10 of them are materials from the Maryland Historical Trust
11 that I've given copies to Mr. Murray and I would offer
12 them now. And I just wish to briefly describe these
13 documents because I think they're of great significance.
14 The first is a letter dated May 18, 1990 from Orlando
15 Writeout, who is chief of the Office of Research Survey
16 and Registration. And he describes his familiarity with
17 this particular property and states that "It contains a
18 major early colonial archaeological site of the mid-17th
19 century and a prehistoric archaeological site from every
20 period from the early archaic period of 8,000 B.C. to
21 the late Woodland period just prior to European



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1 settlement."

2 And the second letter is from another person
3 in the same organization, Gary D. Schaeffer, Ph.D., who
4 is assistant administrator of the archaeological
5 services in the Maryland Historical Trust. And this
6 letter basically documents what information they have in
7 existence now in their files concerning this. And a
8 really good question that somebody might be tempted to
9 ask is why is the critical area concerned with
10 archaeological sites? That's a very good question.

11 And you can read through the critical area
12 regulations and it doesn't mention archaeological sites.
13 But there are two reasons why you are concerned, because
14 you're granting approval of this project and Article
15 83B, Section 5618 speaks of the duties of all state
16 agencies to act in accordance with historic sites and to
17 license, permit -- or place reasonable conditions on any
18 license, permit or award of financial assistance for a
19 proposed undertaking to mitigate any adverse
20 environmental effect -- excuse me, adverse effect of a
21 property listed or determined eligible for the Maryland



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1 Register of Historic Places.

2 Similarly, there's a law known as the Maryland
3 Environmental Policy Act, which says that "All state
4 agencies must conduct their affairs with an awareness
5 that they are stewards of the air, land, water, living
6 and historic resources." It says "Responsibilities of
7 state agencies, environmental amenities and values are
8 given appropriate consideration in planning and decision
9 making."

10 So I guess my explanation for why are we
11 concerned about this is that the Critical Area
12 Commission is a state agency and you're in the position
13 of giving an approval to this project. And this is
14 relevant information contained in these two letters and
15 I offer it in evidence.

16 CHAIRMAN CORKRAN: Have any --

17 MR. MURRAY: Yes, I do. Having had a short
18 period of time to refer to these letters, I don't
19 understand their substance and I'm not prepared to offer
20 anything in the way of rebutting the substance of the
21 letters. But with respect to their admissibility, their



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1 probative value in this proceeding, I would call your
2 attention to the sections of the law that Mr. Murphy
3 just quoted from and specifically ask you to recognize
4 that insofar as this is a unit of the state that's
5 supposed to pay attention to this sort of thing, it says
6 that you're not supposed to do anything that would allow
7 an adverse affect on a property listed in or determined
8 eligible for the Maryland Register of Historic
9 Properties.

10 Nothing I see in these letters says that this
11 is such a property. So A) at least that section of the
12 law doesn't seem to make it applicable to this
13 commission, this panel. Second, the Maryland
14 Environmental Policy Act says that it pertains to
15 proposed state action, which means request for
16 legislative appropriation or other legislative actions.

17 This is an adjudicative hearing. We all know
18 that. That's why we're here. We agreed last time that
19 that's what this was, not a legislative proceeding. So
20 neither of the articulated bases for alleging the
21 relevance of these documents stands up upon reading the



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1 law. And, for that reason, I contend that they should
2 not be admitted into the record.

3 MR. MURPHY: Just very briefly, the proposed
4 state action section of the Maryland Environmental
5 Policy Act, and Mr. Griffin is probably an expert on
6 this more than any of us are, Mr. Deming perhaps too,
7 that deals with requests for state -- for legislative
8 appropriations. That's a proposed state action. When
9 you do that, you have to prepare an environmental
10 effects report. That's one provision of this law. It
11 has nothing to do with the section that says "The duties
12 of state agencies, environmental amenities and values
13 are given appropriate consideration in planning and
14 decision making."

15 It's a section that requires an environmental
16 effects report but it doesn't -- that's a specific
17 requirement. There is still the requirement, and that's
18 not limited to proposed state action, that you consider
19 historic resources in all your planning and decision
20 making.

21 And as far as Mr. Murray's comment that this



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1 is not tied up with a ribbon as to whether it's a
2 declared historic eligibility, that may be the case,
3 that may be the case. But what is your responsibility
4 here? Your responsibility, you've been given the
5 information, is to find out is this a historic site? I
6 mean you have two detailed letters that say "Yes, this
7 is a valuable site." Is it eligible for the register?
8 I mean would our action, forgetting all the bureaucratic
9 technicalities, would our action damage a historic site?
10 And that's a very important thing.

11 CHAIRMAN CORKRAN: Well, we will note the
12 objection but we will admit the letters.

13 MR. MURPHY: Thank you.

14 MR. MURRAY: Thank you.

15 (Whereupon, the above-entitled documents
16 were entered.)

17 MR. MURPHY: Now, finally, I have several
18 letters, three, as a matter of fact, from organizations.
19 I've given these to Mr. Murray. The people are not
20 here. The first one is the Committee to Preserve
21 Assateague Island. They are writing to the commission



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1 expressing concern about this. The letter speaks for
2 itself

3 The second is the --

4 MR. MURRAY: Wait a minute. Wait a minute.
5 Give me a chance.

6 CHAIRMAN CORKRAN: Yes.

7 MR. MURRAY: I would like to object to that.
8 I don't see what the Committee to Save Assateague Island
9 has to do with this project at Queenstown. I understand
10 that what Mr. Murphy is trying to do is line up
11 everybody in the world he can who can say something they
12 don't like about this but at some point it's got to
13 stop. The next thing it's going to be the Committee to
14 Save Florida or the Everglades. I mean at what point do
15 these people have any interest or consideration for this
16 project?

17 MR. MURPHY: May I respond to that?

18 CHAIRMAN CORKRAN: (Nods head affirmatively.)

19 MR. MURPHY: The letter says that they have
20 had experience themselves, down at Assateague and behind
21 Ocean City, they have a similar problem, as explained in



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1 the letter. If you can picture Ocean City, those
2 shallow bays behind Ocean City have a poor, poor
3 flushing capacity. And they're relating that they have
4 a similar problem down at Ocean City with golf courses.
5 That's what they have to do with it.

6 CHAIRMAN CORKRAN: All right. We'll note that
7 objection.

8 MR. MURRAY: Thank you, sir.

9 THE REPORTER: Are you entering this?

10 MR. MURPHY: Yes, I am.

11 (Whereupon, the above-entitled document
12 was entered.)

13 MR. MURPHY: The second letter is from an
14 organization known as Save our Streams and they're
15 objecting to this property of a golf course being
16 designated a resource conservation use.

17 MR. MURRAY: Same objection.

18 MR. MURPHY: They're a statewide environmental
19 organization. They're motto is "Leading the way to a
20 healthy Chesapeake Bay."

21 CHAIRMAN CORKRAN: We're going to note the



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1 objection.

2 MR. MURRAY: All right. Thank you, sir.

3 (Whereupon, the above-entitled document
4 was entered.)

5 MR. MURPHY: The final letter is from the
6 Maryland Conservation Council, which is a statewide
7 coordinating environmental organization. It lists three
8 reasons why, in their view, the property is not eligible
9 as an RCA use, the prohibition on commercial uses, the
10 nature dominated aspects and the unusual environmental
11 sensitivity of the site.

12 MR. MURRAY: The same objection. And, in
13 addition, I will relate to one I made earlier, that is
14 the panel is charged with the responsibility of
15 interpreting some regulations; these people purport to
16 be telling you what your regulations are. I submit
17 that's none of their business.

18 CHAIRMAN CORKRAN: We'll note that objection.

19 MR. MURRAY: Thank you, sir.

20 (Whereupon, the above-entitled document
21 was entered.)



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1 MR. MURPHY: With that, I would thank you very
2 much for your courtesy in my handling of this matter and
3 I'll conclude my case.

4 Thank you.

5 CHAIRMAN CORKRAN: All right. Thank you.

6 MR. DEMING: Let's take Ren Serey next.

7 What I would propose to do is we have one
8 letter that Mr. Serey has received and so I propose to
9 ask him two questions, I guess in the nature of direct,
10 and then Mr. Murray and Mr. Murphy can cross.

11 Whereupon,

12 REN SEREY,

13 a witness, called for examination by counsel for
14 Critical Area Commission, was duly sworn, and was
15 examined and testified as follows:

16 DIRECT EXAMINATION

17 BY MR. DEMING:

18 Q Mr. Serey, I'd like to hand you a document and
19 ask if you could identify it?

20 A Yes. This is a staff summary that was
21 prepared for the panel before the opening day of



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1 testimony last month.

2 Q This is the document that was handed to
3 counsel for both sides at the April 23rd hearing?

4 A Yes, it is.

5 MR. DEMING: As we didn't do it the last time,
6 I'll go ahead and offer this into evidence at this time.

7 MR. MURRAY: No objections.

8 MR. MURPHY: No objection.

9 (Whereupon, the above-entitled document
10 was entered.)

11 BY MR. DEMING:

12 Q Mr. Serey, in item 6E of that letter, on page
13 three, with regard to a great blue herring nesting area,
14 reference is made to contacting the Forest Park and
15 Wildlife Service, did you do that?

16 A Yes. The office did. I didn't do it
17 personally.

18 Q Did the office receive a response?

19 A Yes. Two of our staff members met with Mr.
20 Glenn Therres for the Department of Wildlife Service.

21 Q Would you identify that document, please?



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1 A This is the letter that Mr. Therres sent to
2 the commission following that meeting.

3 MR. DEMING: I would offer this into evidence
4 at this time, the letter of May 17th, 1990 from Mr.
5 Therres.

6 MR. MURRAY: I don't have an objection to the
7 admissibility of this document.

8 MR. MURPHY: No objection.

9 MR. MURRAY: I would like to comment, however,
10 that this is an example of the kind of thing that the
11 panel should be fully aware of it's context. This is a
12 complicated project with a lot of design considerations.
13 And what this letter from Glenn Therres does is
14 supplement a letter he wrote, which is also attached to
15 the letter you just received, dated back in March of '88
16 to Charles Birney, related to giving some buffer
17 protection to a blue herring colony.

18 Apparently part of the design, since that
19 time, changed and, as a result, Mr. Therres thinks some
20 additional buffering and planting is appropriate. We
21 have no problems with that. And I want to make it clear



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1 to the panel that it merely illustrates the kind of fine
2 tuning that is going on and will continue to go on. The
3 issues before this panel, as we understand them, and as
4 I think were contained in the panel's original statement
5 about its charge, were not necessarily to fine tune the
6 project to a final building plan but rather to take its
7 essential parameters, which I think are very close to
8 being done, with the exception of fine tuning.

9 So please understand the context in which this
10 letter appears. We have no problems with its substance.

11 CHAIRMAN CORKRAN: Thank you.

12 (Whereupon, the above-entitled document
13 was entered.)

14 MR. DEMING: His witness now.

15 CHAIRMAN CORKRAN: Okay. Do you have
16 rebuttal?

17 MR. DEMING: No, cross-examination.

18 (Whereupon, there was a discussion off
19 the record.)

20 CROSS-EXAMINATION

21 BY MR. MURRAY:



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1 Q Mr. Serey, I read your report and I didn't
2 understand some of the numbers contained in it. I'm
3 sure that, with a couple of questions, you can get it
4 clear for us. You had a section, on page one, called
5 "Summary of Proposal within Critical Area?"

6 A Yes.

7 Q Acres in critical area. Now 394 is what you
8 said.

9 A Yes.

10 Q Is that for the whole farm or for the golf
11 course project?

12 A This represents, I believe, the number of
13 acres of the farm located in the critical area.

14 Q Okay. And that's the whole farm not just the
15 golf course site, which, as you recall, is a little over
16 400 acres in total?

17 A The figure was taken from the block of data
18 submitted with the site plans.

19 Q Sure. But the block contains lots of other
20 data?

21 A Yes, it does.



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1 Q For purposes of our discussion, I want to make
2 sure I understand that we're talking apples and apples
3 and not apples and oranges.

4 A I believe the figure represents the amount of
5 acres of the farm within the critical area.

6 Q Okay.

7 A That was my understanding of the summary.

8 Q Now is that also the same for the 198 figure
9 or is that 198 agricultural acres in the site?

10 A I believe it represents the number of
11 agriculture acres in the critical area.

12 Q In the whole farm?

13 A Yes. That's my understanding.

14 Q And it's your understanding that after this
15 project is constructed, there will be 30 acres remaining
16 in agriculture on the whole farm?

17 A Within the critical area.

18 Q Okay.

19 A Again, all of that is my understanding of the
20 information submitted.

21 Q Okay. You just clarified one point; now I



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1 understand. So all of these numbers, then, are A) whole
2 farm, B) in the critical area?

3 A No, I don't believe so.

4 Q Okay. That's where I get confused.

5 A Only critical area acreages. I've intended
6 to represented only critical area acreages.

7 Q But critical area acreages on the whole farm
8 as opposed to just the golf course site?

9 A I believe so.

10 Q And I guess what I'm asking is what you did
11 consistent, every one of these numbers is critical area
12 acreages, as described on the whole farm?

13 A That was my intention.

14 Q Okay. Now the acres to be disturbed, that 232
15 number?

16 A Yes.

17 Q Where did you get that from?

18 A From the data submitted on the site plan.

19 Q Do you know what that means, that word
20 "disturbed?"

21 A It was not defined.



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1 Q So it's subject to being defined, as far as
2 you're concerned?

3 A Yes. I believe that was the term used on the
4 site plan, "acres disturbed."

5 Q And you indicated, on page two, that the
6 commission has mapped some existing golf courses as RCA?

7 A Yes.

8 Q And some have been mapped LDA?

9 A Yes.

10 Q The distinguishing characteristics being the
11 level of development on the course and in the
12 immediately surrounding area?

13 A I believe that was the primary distinguishing
14 factor.

15 Q Looking to the page three and four of your
16 report, where you make certain recommendations --

17 A Yes.

18 Q -- are these the kind of recommendations that
19 the staff would typically make in connection with a
20 project review?

21 A Well, this is not a typical project in any



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1 way. If I could explain: The commission has approval
2 authority and has exercised approval authority in the
3 past only regarding state projects. These are the type
4 of recommendations the staff would make regarding state
5 projects. All other development projects within the
6 critical area are authorized and approved at the local
7 level. The recommendations that the commission would
8 make to the local government, when it is reviewing a
9 project, may, at times, be worded like this. They're
10 not necessarily as specific. It's not real easy to
11 characterize that type of recommendation.

12 Q Well, should this project be approved by this
13 panel and then, in turn, by the Critical Areas
14 Commission, it would still be subject to project review,
15 wouldn't it?

16 A Project review by whom?

17 Q The commission, by the staff.

18 A Yes.

19 Q So some of these fine-tuning types of things
20 would occur or could occur at that level?

21 A Yes.



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1 Q I know that this is not typical, it may even
2 be unique, but what is the basis, if you can point me to
3 one, for your apparent view that the commission has the
4 authority to impose any of these kinds of restrictions?

5 A That's not my role and that's for the
6 commission, for the panel.

7 Q Okay. So the recommendations, you think
8 they're wise but whether they're legally mandated or
9 permitted, you don't have an opinion one way or the
10 other?

11 A Yes. If you look at recommendation -- at
12 point number six on page three, you'll notice that the
13 beginning phrase puts its in the conditional, if the
14 commission approves the project. The staff is not
15 taking any position whether the commission can or should
16 approve a project.

17 Q I understand that. My question is what
18 authority does the commission have, if any, in your
19 knowledge, to impose these kinds of conditions if it
20 approves the golf course use in the RCA?

21 A I'm not aware of that.



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1 Q Now let me walk you through them. I just want
2 to ask about each one. The first one, you say, is
3 "Dwellings shall not be developed in the critical area
4 except through the use of growth allocation." Now the
5 critical area, again to be clear, we're talking about
6 the whole farm or are we only talking about the part of
7 the farm that's part of this golf course project?

8 A This recommendation would only apply to the
9 part of the farm proposed for the golf course?

10 Q Okay. I assumed that but it didn't say that
11 and I wanted to be clear. And is your reasoning there
12 that the intensity of the use of the golf course is
13 enough that there ought not be increased intensity,
14 whether through residential or otherwise, without use of
15 growth allocation?

16 A That's one way to state the point. The staff
17 feels that a golf course represents a degree of activity
18 that is not equated, essentially, with one of the
19 authorized uses, such as a farm or forestry, that it
20 represents something else.

21 Q The second one is, this is 6B, "Existing water



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1 dependent facilities on Queenstown Creek shall not be
2 used or expanded for access to the golf course." Are
3 there existing water dependent facilities?

4 A There is a boat house and a dock.

5 Q Now is that what is meant by the term "water
6 dependent facilities?"

7 A Yes, in this context. Water dependent
8 facilities are defined in the Critical Area Commission's
9 right. They are defined as a use that cannot exist as
10 water use based, such as a dock or a pier, in this case
11 a boat, by its nature is dependent upon water.

12 Q You go on to say that "That dock and boat
13 house shall be used or expanded for access to the golf
14 course."

15 A Correct.

16 Q Well, you heard the testimony, did you not,
17 from Mr. Birney, way back at the beginning of this
18 hearing --

19 A Yes.

20 Q -- that there was nothing in the plans --

21 A Yes.



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1 Q -- about expanding the use or promoting the
2 use for access to the golf course?

3 A Yes, I heard that.

4 Q But I am concerned about this "shall not be
5 used for access to the golf course." What does that
6 mean? Does it mean that no one can ever use that dock
7 and walk from the dock to the golf course?

8 A I don't know whether it means can one person
9 legally ever do that. The idea behind the
10 recommendation was that if a golf course were developed
11 and it was open to the public, the staff didn't feel
12 that the public should use that -- should arrive at the
13 golf course by a boat and use that facility, that it
14 would generate a type of activity, again, not consistent
15 with an RCA designation.

16 Q Well, I mean perhaps you're having the same
17 trouble I am but is there a line to be drawn between
18 intentional commercial use of that dock and occasional,
19 unpromoted, inconsequential use of the dock?

20 A I would think one way to carry out this type
21 of restriction, if it were imposed, would be by virtue



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1 of signs at the dock and by virtue of not promoting the
2 use. I can't imagine that a guard would need to be
3 posted for a single user.

4 Q I mean I don't think this will ever happen but
5 who knows, suppose the golf course is built and Mr.
6 Carroll decides to come visit by boat, we wouldn't want
7 to keep him away. Would this provision purport to do
8 that?

9 A What this provision would do is it embodies a
10 recommendation that would say the managers of the golf
11 course might speak to Mr. Carroll and advise him the
12 next time to arrive by automobile.

13 Q I see. All right. The next one is that "The
14 Commission wants to approve fertilizer and pesticide
15 lists." I think you heard all the testimony about the
16 IPM and the best management practices and you probably
17 read the reports?

18 A Yes.

19 Q And understand that's the dynamic thing that's
20 going to change from time to time; periodically, there
21 will be different fertilizers, different chemicals, the



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1 application rates will change depending upon the
2 circumstances. In terms of providing with information,
3 that's not a problem. In terms of saying what is going
4 to be done at times distant in the future, it's
5 incompatible with the idea of the IPM. Do you
6 understand that?

7 A I understand some of it. The idea behind this
8 recommendation came from the list of fertilizers and
9 pesticides that was provided in the environmental
10 report. The list described a program that was used at a
11 golf course in Prince William County, Virginia and,
12 within that list, was one substance that the staff
13 understands has not been -- has been banned by the
14 Environmental Protection Services.

15 Q I understand that too and I think it was a
16 mistake.

17 A Well, maybe so. Or at least an outdated list.

18 Q Yes.

19 A It raised some concern with the commission
20 staff.

21 Q I guess the only thing that I have some



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1 question about, having heard all the testimony about the
2 IPM and so on, the rate and timing of applications is
3 something that will change all the time, so it's very
4 difficult to predict well in advance what that will be,
5 and yet that's what you say here. I just want to be
6 clear whether you're really intending that?

7 A The intention here is that to the degree that
8 the rate and timing of application are specified
9 substance by substance, that that will be adhered to.

10 Q So whatever the program is, you want to know
11 about it?

12 A Yes.

13 Q The next one is "An analysis of potential
14 impact to surface and groundwater quality, fish, plant
15 and wildlife habitat." That's the kind of thing you
16 heard some of the experts today testify about as being
17 appropriate?

18 A Yes. I guess it's similar to what some of
19 them were saying. The reason for this recommendation
20 was that there are many statements in the environmental
21 report which are quite general and the staff felt that



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1 some more specific analysis should be provided.

2 Q "Storm water should be managed for quality and
3 quantity before reaching." There doesn't seem to be any
4 question in anyone's mind, that I've heard about,
5 quantity. Quality, is that basically the same kind of
6 -- it's part of the analysis of potential impacts and --

7 A Yes, it is.

8 Q -- minimum --

9 A Yes, it is.

10 Q We've dealt just now with "E," the herring
11 buffer. Is that your understanding, that if we comply
12 with Mr. Therres' latest letter, we satisfy 6E?

13 A That's my understanding.

14 Q And then "F" says that "The Commission's
15 decision in this case is not binding in any other case."

16 A It doesn't apply to this case.

17 Q Thank you.

18 MR. MURRAY: That's all I have.

19 CHAIRMAN CORKRAN: Mr. Murphy?

20 CROSS-EXAMINATION

21 BY MR. MURPHY:



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1 Q Mr. Serey, on the first page, I got a little
2 confused about Mr. Murray's questions about total farm
3 or farm area. The acres in the critical areas is the
4 acres on the project which we reviewed that are in the
5 critical area, isn't that right, on the maps we reviewed
6 that have been up here?

7 A That's my understanding that these acreage
8 totals were taken solely from the information provided
9 to me, the summary data on the site plan. No
10 independent --

11 Q It includes both farmland and forest land, the
12 total acreage in the site that's depicted on a site
13 plan, isn't that right?

14 A Yes.

15 Q It's in the critical areas, 394 acres, that's
16 what you --

17 A Yes.

18 Q And the existing areas in agricultural use,
19 again you say that's the agricultural use in the
20 critical area is 198? The agricultural area to remain
21 is 30? Do I take it, then, that 168 acres are being



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1 removed of agricultural land?

2 A If that's what it comes out to.

3 Q Now when you speak of designating existing
4 golf courses, when you established the critical area
5 mapping, the criteria were a little different, weren't
6 they, for mapping then they are for new uses? For
7 example, you mapped RCA land when the development was
8 one house for every five acres and new uses can only be
9 one house for every 20 acres, isn't that correct?

10 A Correct.

11 Q So your mapping determinations are not
12 necessarily governing what new uses you allow; is that
13 correct?

14 A The mapping determinations made at the time of
15 program approval were solely on the existing golf
16 courses. I don't know to what extent, if any, the
17 commission used or thought about future development. I
18 know that the criteria for mapping indicated that they
19 were not to consider future development.

20 Q My point is is that you say they were based on
21 the amount and intensity of development adjacent to and



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1 within each particular golf course but when you were
2 mapping the RCA's, you mapped land RCA that had a
3 different density standard than you would apply now --

4 A Yes.

5 Q -- in approving new RCA?

6 A Yes, that's correct.

7 Q Now I don't want to ask you to give me any
8 legal advise but I just want to find out from you your
9 understanding, and this was gotten into by Mr. Murray,
10 but you're asking the commission to apply this as a
11 condition, these conditions shown on page three, right,
12 conditions of approval?

13 A Yes. That is assuming the commission has that
14 authority.

15 Q Assuming they have their authority. I mean
16 you're certainly familiar with the regulations. Is
17 there any section of the regulations you might point me
18 to that seems to confer the authority to put conditions
19 on an approval?

20 A I don't believe that that authority was
21 discussed.



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1 Q It's not contained in the regulations?

2 A I don't believe so, no. May I clarify?

3 Q Certainly.

4 A I don't believe it is addressed as such,
5 specifically under a heading of "Authority." Whatever
6 authority the commission may have from any other source,
7 I don't know that.

8 Q I'm just familiar with, you know -- For
9 example, I do a lot of zoning and in Article 66B, it has
10 the Board of Zoning appeals and it specifically says
11 "The Board can impose conditions on projects." There
12 isn't any specific language that you're aware of that
13 says that?

14 A No specific language.

15 Q In subparagraph three there, on page three,
16 C3, you want an analysis of potential impacts to surface
17 and groundwater quality and fish, plant and wildlife
18 habitat. You were present, I believe, all day today and
19 you heard people such as Dr. Brinsfield explain the
20 underwater situation in relationship of the nitrates to
21 the groundwater and the bays. Is that the type of thing



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1 that you're interested in, an analysis of that nature?

2 A That's the type -- That's one type of
3 information, yes.

4 Q And really, before we do this analysis, do we
5 know what the potential impacts are? I mean we're doing
6 the analysis to determine what the impacts are; is that
7 right?

8 A We know what some of the impacts are. Some
9 are described in the environmental report that has been
10 submitted. The staff feels that some more specific
11 analysis is necessary.

12 Q And this information would be presented to the
13 commission and they're the ones to take action on these
14 things, would they have to then consider the
15 environmental effects of the golf course, is that what
16 you envision?

17 A That's the staff recommendation.

18 MR. MURPHY: That's all I have.

19 Thank you.

20 CHAIRMAN CORKRAN: Mr. Griffin.

21 MR. GRIFFIN: I just have a quick question.



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1 EXAMINATION BY COMMISSION

2 BY MR. GRIFFIN:

3 Q What is the current capacity of the dock at
4 the site, in terms of the number of boats that might
5 reasonably be docked today?6 MR. MURRAY: We visited there today. It has
7 two sides which are dockable. One is attached to the
8 land and the other is very shallow water. Bill, help me
9 with this, my guess is you're talking about two large
10 boats and maybe six smaller boats.11 MR. MURPHY: I'm sorry. Could I ask a
12 question following up Mr. Griffin?

13 CHAIRMAN CORKRAN: Sure.

14 MR. MURPHY: I had it written down here but I
15 didn't do it.

16 FURTHER RECROSS-EXAMINATION

17 BY MR. MURPHY:

18 Q One thing I'm a little confused about, Mr.
19 Serey, is just this point that Mr. Griffin raised. You
20 say that "Existing water dependent facilities on
21 Queenstown Creek should not be used or expanded for

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1 access to the golf course." And I guess everybody is
2 referring to the dock which is at the property now?

3 A Correct.

4 Q And you said that the rationale for that was
5 that you didn't feel it was appropriate for this golf
6 course use to be taking people from the water and I
7 guess you have a fear it might lead to boat traffic that
8 might have some environmental problems, is that part of
9 it?

10 A That would be part of it. The basic part of
11 it is that the staff feels that type of water use to
12 this facility is indicative of a higher level of
13 development and is appropriate in the resource
14 conservation here.

15 Q Well, now this sounds real technical but you
16 say that "The existing water dependent facilities --"
17 which means the dock, I guess, "-- shall not be used or
18 expanded for access to the golf course." But would the
19 applicant be free to build a new one? I mean you say an
20 existing one. Should it really read that "No water
21 dependent facilities shall be used?"



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1 A Any water dependent facility, any new
2 facility, would have to meet the critical area criteria
3 and the Queen Anne's County program. The staff believes
4 that a new facility, located anywhere, to be used for to
5 bring people to the golf course to play golf, is, again,
6 indicative of a higher level of development.

7 Q So the recommendation would apply just as much
8 to a new facility as to the existing?

9 A Yes. But what the recommendation assumes is
10 that growth allocation is always available for any level
11 of development higher than the existing designation.

12 Q I mean you're aware that there has been
13 discussion over the years of using a portion of growth
14 allocation for this property, isn't that correct?

15 A Yes. That was part of one of the earlier
16 proposals.

17 Q And are you saying that if they wanted to use
18 growth allocation, they could then build a dock, is that
19 what you're saying?

20 A They may be able to.

21 Q Well --



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1 A There are other considerations involved in
2 growth allocation.

3 Q But that really wouldn't affect water quality,
4 would it? I mean is this recommendation dealing with
5 water quality?

6 A The recommendation is dealing with a level of
7 use. In other words, it's primarily a resource
8 conservation use recommendation. The water quality is
9 then part of any use. But the recommendation was not
10 put there strictly for the improvement or the
11 maintenance of water quality.

12 Q Do you agree that Mr. Carroll has a seemingly
13 valid concern about a large number of boats in the creek
14 and possible environmental concerns they might create?

15 A Yes. I've heard him say that.

16 Q Do you have any experience with knowing
17 whether that's a reasonably valid concern or not?

18 A No, I don't. I don't know the details of the
19 water quality analyses that have been performed.

20 Q Are you aware of the existing condition of the
21 creek?



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1 A No, I'm not.

2 Q Would that be something that would be
3 addressed in this environmental study?

4 A We would like to see some analysis of that.

5 Q Thank you.

6 MR. MURPHY: That's all I have.

7 CHAIRMAN CORKRAN: Thank you.

8 MR. MURRAY: John Knickerson.

9 Whereupon,

10 JOHN KNICKERSON,
11 a witness, called for examination by counsel for
12 Washington Brick, was duly sworn, and was examined and
13 testified as follows:

14 DIRECT EXAMINATION

15 BY MR. MURRAY:

16 Q Mr. Knickerson, please identify yourself for
17 the panel.

18 A I'm the director of environmental health for
19 Queen Anne's County.

20 Q Mr. Knickerson, before we begin, I'd like to
21 thank you for sticking around so late this evening. I



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1 know that's well beyond the call of duty.

2 If this property has a golf course located
3 on it, in a septic system as has been described, is
4 located, designed, constructed and operated as
5 proposed, will it pose a threat to little Queenstown
6 Creek?

7 A It would be our opinion it would not. I can
8 clarify that if you would like clarification.

9 Q By all means.

10 A We have two management areas in Queen Anne's
11 County. One is referred to as management area "A." The
12 other area is referred to as management area "B." And I
13 personally read a groundwater protection report for this
14 county that delineated those management areas.

15 Management area "B" is an area that routinely
16 the health department, over the years, had allowed
17 direct groundwater penetration of the sewage, at that
18 point, in places. And I took the position, when this
19 report was done, to discontinue that practice and
20 require a minimum of two feet unsaturated material above
21 the seasonal high water table, as documented by



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1 pyzometer readings over the course of the high water
2 table season.

3 The health department has 32 test wells on the
4 seven lower shore counties that we have test data
5 monitoring on those over the last 15 years -- A few of
6 them are even older than that -- which gives us an
7 indication when the seasonal water table would be
8 expected to reach its higher points. And using that
9 test data from these monitoring wells is when we would
10 establish what the water table could be expected to be a
11 normal water table there.

12 This particular site has four soil types on it
13 that are predominant. One of them is the manopex,
14 another one is a manopeak. There is a woodstown and a
15 downer, with just a small amount of othello. And these
16 soil types, the manopex, the othello, the manopeaks, are
17 a silt loam that are underlain by fine sandy loam.
18 Depending on where you're at on the farm, the water
19 table could range anywhere from ground surface to up to
20 ten feet below the ground surface.

21 Traditionally, the health department would



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1 stress that the sewage waste be placed in an area that
2 you could get it be renovated or attenuated, which is
3 normally the highest elevation on the coast of plain
4 soils. And this is where the tests have been stressed
5 as far as this particular project. We have done
6 monitoring data this past wet season. I physically have
7 done some perk tests, not this year on the property but
8 on previous years, and the data that we had would
9 indicate that the seasonal water table, where the waste
10 disposal system is being proposed, will maintain a
11 minimum of 24 inches attenuation, during even the worst
12 case high water table season.

13 Now coming back to the management "B" area,
14 that is the Talbot or the Kent Island formation, as far
15 as an unconfined aquifer. I think it was Dr. Brinsfield
16 alluded to the Columbia formation as a confined aquifer,
17 which is inaccurate information; it's the unconfined
18 aquifer that makes up the bulk of the coastal plain
19 soils as you swing towards Caroline County and down
20 through Wicomico County. That aquifer, we require a
21 high degree of perfection because it is used as a



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1 drinking water source. We do not permit any shallow
2 wells from Queenstown south and haven't for the last
3 20 years in this particular county.

4 I will say this, as a matter of record, I am
5 only addressing it from the standpoint of a health
6 department regulatory concern here. And I take no
7 position one way or the other whether this project is
8 approved or disapproved. I have no concerns. I'm not
9 being paid by anybody to have any concerns. But when
10 you look at any risk assessment, there are a lot of
11 factors you have to look at. We look at bacteria
12 potential, bacterial contamination of well water in
13 particular and we stress that there not be wells that
14 would be in the area that could get contamination from a
15 waste water.

16 The waste water that is generated from a
17 septic system is normally in the ammonia type forms. It
18 has not been oxidized. It is not nitrates. There's
19 only one way you can get the nitrate form of the
20 nitrogen and that's if you have soils that are very well
21 drained. And they allow oxygen in the soil that allows



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1 the nitrogen to combine with the oxygen and it forms
2 nitrates, which is a negative ion. Your soil particles
3 are negatively charged here. And if the nitrates get
4 below the root zone of any plant material, they will go
5 down into the water table. That's a known fact, without
6 any question at all.

7 We have data on over 5,000 wells from
8 Queenstown down in this particular health department.
9 The shallow water table, where you have the unconfined
10 aquifer there, where you have conditions that the soils
11 are not strongly well drained, you will not run into the
12 nitrate form in those water tables because it never gets
13 a chance to be oxidized. If you get along the river
14 banks where the soils are very well drained, like
15 Kings Town area, Crumpton area and even sections of
16 LaPointe, the ammonia, the breakdown of leaves and
17 organic waste and septic waste, will get a chance to go
18 to nitrate forms. And you will traditionally see this
19 one to three parts per million level that was alluded to
20 here originally.

21 Now as far as the leaking into the creek, we



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1 don't really address that. I do not do such a
2 comprehensive hydrology study to say "Will that waste
3 lead to the creek?" I will say this: In any
4 hydrogeology study that you do, the short-circuited flow
5 patterns in an unconfined aquifer are very hard to
6 describe; I don't care who is looking at it. And it
7 will even reverse itself during different periods of the
8 year. You heard one gentleman here talk about if you
9 pumped out of a pond how that saline water or the
10 estaurine water might try to encroach into that shallow
11 water table. In other words, the flow is not leaking to
12 the creek in that instance, it's actually going back
13 into the strata.

14 So I would, from my experience, of 18 years of
15 dealing with this and looking at around 7,000 test holes
16 in this particular county, in general, run-off has a
17 more severe effect on creeks than the leakage that comes
18 out of the unconfined aquifer, based on the statistics
19 that I've read and the information I've read on
20 regulatory reports and studies.

21 I heard the Dr. Brinsfield allude to the Penn



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1 State study, where he said "Corn had less infiltration
2 into that shallow water table of herbicides and
3 pesticides," which we do not look at personally, but I
4 had some background in that from school, at the
5 University of Delaware, in what they call plant
6 pathology and animality. We did some studies on
7 paybate, which was an organophosphate used by Delaware
8 for mosquito larva slides.

9 I would only say this: It would be my
10 judgment you've got to know what you're looking at with
11 those comments also. You could get the run-off from a
12 corn crop on heavy rains and the material would not be
13 left on the farm, okay. And if you have a grass, you
14 will not get the run-off, you will get more infiltration,
15 which is what he was alluding to and I would agree that
16 that's probably accurate.

17 The question becomes, that we look at in the
18 whole report, not only for the bacteria, the nitrates,
19 is the loadings, what you can do with the actual
20 loadings, he referred to as the water budget, I think he
21 called it. Well, it's not just the amount of water



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1 that's going on the property, it's how it goes on, how
2 fast it goes on and what chemicals you are putting on at
3 any given time as to what is going to run off or what is
4 going to infiltrate. There's no magical formula. It's
5 either going in the ground, running off, or evaporating
6 or being taken up by the plant. You don't lose it.
7 You know, those are the four places it can go.

8 And the studies that we've seen so far, as far
9 as the septic waste, would indicate that we are
10 comfortable that it would take approximately an acre of
11 ground to service the proposed 5,000 gallons of waste
12 water, with a minimum of two more acres to be set aside
13 for a recovery area, to replace the original
14 installation. And that's got to be fine-tuned some
15 more. The final data hasn't come in from our state
16 office Department of Environment, who is concurrently
17 looking at this with us. But based on the information
18 we have right now, there is that available land mass to
19 handle this, the golf course proposal.

20 Q And before you approve it, you'll make sure
21 it's done right?



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1 A Well, we have to meet minimum standards. Now
2 I can't address everything that has been spoken here,
3 like I say, because we do not do that type of
4 comprehensive hydrogeology study. It's costly. You've
5 got to know what you're looking for. You've got to know
6 what points you're trying to prove. And you've got to
7 really be unbiased in the whole picture of what you're
8 looking at in it.

9 And as far as infiltration, the bacteria or
10 microscopic plants, we believe that by maintaining this
11 two foot, by studies that we've looked at, that it will
12 be more than two foot during the non-high water table
13 season. It will probably attenuate and clean up the
14 bacteria.

15 The nitrates, I personally believe you'll get
16 very little oxidation, even though we're maintaining
17 this two foot of material and it may be three and four
18 foot. It will stand a lot of ammonia type forms. But
19 what nitrates do get in there, you will be having a
20 dilution effect and the health department does look at
21 dilution effects with nitrates because it's a known



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1 fact, when you do get nitrates, if it gets below the
2 root zone, it's going in the shallow water table, that's
3 for sure. There's no question about that.

4 MR. MURRAY: That's all the questions I have.

5 Thank you.

6 CROSS-EXAMINATION

7 BY MR. MURPHY:

8 Q You will have to excuse me. I didn't catch
9 your name.

10 A John Knickerson.

11 Q Well, have you been here the whole time, Mr.
12 Knickerson?

13 A Well, I've been in and out to a couple of
14 meetings, patiently waiting.

15 Q Do you disagree with the staff recommendation
16 that before the gulf course is approved, there ought to
17 be an analysis of potential impacts to surface and
18 ground water quality, and fish, plant and wildlife
19 habitat?

20 A I didn't say I disagree with that, no.

21 Q It's my understanding that when you talk about



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1 the ability of land to perk and that sort of thing,
2 you're basically talking about the ability of the
3 substances that move through the soil, and won't there
4 be some nitrates that go down to the water table that
5 even though they're treated for and they meet public
6 health standards, that's not necessarily the same as
7 saying they're not contributing to the nitrogen loading
8 in the ground water?

9 A My comment would be, again, our experience --
10 and I'm not trying to divert here, but Gary Miller, I'm
11 going to use their name as an engineering firm that is
12 pretty strong in hydrogeology that I've used on Dr.
13 Ducet as a reference when I did our ground water
14 protection report.

15 Most of your nitrate problems, you will find
16 only exist on extremely sandy, well-drained soils. The
17 things that were alluded up in Boston or up in
18 Massachusetts where you had 56 feet down to the water
19 table with a lot of sand, yes, you're going to get a lot
20 of oxidation, but where you have these fine-textured
21 silt loams and fine, silty sandy loams, we do not see



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1 hardly any nitrates, based on our data, of any
2 significance in those type soils. It never gets a
3 chance to be oxidized.

4 So, NO_3 is three oxygens added to that
5 nitrogen. You start out with an ammonia in a septic
6 waste and it's got to have a chance to get oxygen to it,
7 or it's not going to oxidize.

8 Q Aren't some of these soils sandy?

9 A Yes.

10 Q And well-drained?

11 A I would call them moderately drained.

12 Q Won't some of the nitrogen that's in the
13 fertilizer, won't it go down to the water table?

14 A There is a risk. If you have an overloading
15 of water, there is always a risk in the management --
16 its being water soluble -- of it being carried down
17 before the plane can take it up.

18 Q Won't irrigation tend to increase that risk?

19 A If it's not done right, you're right: it's
20 possible.

21 Q And even an unanticipated storm?



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1 A That's true. Our experience from the Health
2 Department is that the bacterial loadings and the
3 loadings that we see in estuaries, we can document more
4 of effect of run-off, though, I guess is what I'm
5 saying, more so than the hydraulic loading from the
6 leaking unconfined aquifer into that estuary because
7 nature's pattern is to try to protect itself, and it
8 tries to make all of the little grasses and everything
9 along the edges of the estuary.

10 If you have a lot of run-off, it tends to kill
11 those grasses -- you follow me -- on a heavy rain, if it
12 runs off.

13 So the general Health Department approach has
14 always been it's better to have it infiltrate than to
15 just let it run off. That's the one of the principles
16 of why they stress spray irrigation.

17 Q Your concern is the public health standard,
18 and it's not necessarily the aquatic resources, say, of
19 the creek or Chester River?

20 A No. I would only clarify this. We are
21 involved in the shellfish industry and the regulation of



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1 it; and, obviously, any pollutant of that stature that's
2 going in that would affect those waters, we're certainly
3 concerned with.

4 Q Are you aware of the studies that have been
5 done on Queenstown Creek that indicated it's a stress
6 condition?

7 A Yes.

8 Q You would agree with that?

9 A I would agree with any load-flushing estuary
10 would tend be stressed every time there is a heavy
11 rainfall.

12 Q Isn't it, in fact, also stressed by the sewage
13 discharge into the creek?

14 A That's true.

15 Q Is that a different substance than is
16 discharged from the septic tank?

17 A It's receiving secondary treatment. To my
18 knowledge, there is not tertiary treatment at that
19 plant, which would be nitrogen removal, and one of the
20 state's recommendations was they would prefer that that
21 effluent be spray irrigated on that particular farm and



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1 clean it up properly.

2 Q That's not part of this proposal, though?

3 A No, but if you're asking me a question on how
4 to handle wastewater, it's a known fact that it would be
5 better, instead of discharging that creek, to put it on
6 a grass strip and filter out as much nitrogen instead of
7 just sticking it out there in the water causing algae --
8 along with phosphorus.

9 Of course, phosphorus is tied up in the soil.
10 It's not like nitrogen. Once it gets in the soil, it
11 just doesn't go anywhere. It's tied up.

12 MR. MURPHY: That's all I have. Thank you,
13 Mr. Knickerson.

14 CHAIRMAN CORKRAN: Do you have a question, Mr.
15 Griffin?

16 MR. GRIFFIN: Yes.

17 EXAMINATION BY THE COMMISSION

18 BY MR. GRIFFIN:

19 Q Speaking of land treatment of sewage effluent,
20 we've heard that referred to a few times. I assume you
21 have some knowledge of what has happened recently.



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1 Why is it that that proposal, if I can call it
2 that, wasn't accepted here?

3 A By Queenstown?

4 Q Yes.

5 A You have to ask the town representatives.

6 Q Okay. I thought you might have known
7 something.

8 A I don't know all of the ins and outs of the
9 local politics on it.

10 MR. GRIFFIN: I just thought I would ask.
11 Thank you.

12 MR. MURRAY: Thank you, Mr. Knickerson.

13 CHAIRMAN CORKRAN: Thank you.

14 MR. MURRAY: Mr. Crowding. Mr. Crowding
15 testified before, so I'm not going to take up the time
16 to qualify him again. His background is in applying the
17 local zoning ordinances.

18 Whereupon,

19 MR. CROWDING,
20 a witness, called for examination by counsel for the
21 Proponents, having been previously sworn, was examined



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1 and testified as follows:

2 DIRECT EXAMINATION

3 BY MR. MURRAY:

4 Q Mr. Crowding, what are the Queen Annes County
5 setback requirements for agriculture?

6 A Right now, for just agricultural use, there
7 are none. They currently have a Best Management Plan,
8 which is under the Critical Areas criteria, which calls
9 for a 25-foot filter strip to be placed around all "ag"
10 property within a certain date, I believe.

11 Q So, active farming can occur up to within 25
12 feet of tidewater?

13 A Yes, I believe so.

14 Q What is the setback on this golf course
15 project?

16 A Three hundred foot.

17 Q What is the setback on residences in this
18 zone?

19 A For residences -- for existing residences,
20 they can be where they are now. They're lined ten feet
21 or whatever.



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1 For large lot residential subdivisions, if we
2 went in there and cut them into 28-acre lots, per se, on
3 this or any other farm, we could go to a 100-foot
4 setback.

5 Q Will you explain to the Commission what a
6 "transferable development right" is?

7 A In Queen Annes County, it works for -- and
8 whatever type area you are, whether it's an agricultural
9 zone or a countryside zone, you can bring in a
10 development right from another piece of property at the
11 same development rate as the land which you're
12 developing.

13 So, in this case, if you're transferring onto
14 a piece of countryside property in the Critical Areas,
15 you could bring in as many dwelling units as they would
16 allow at a one per 20.

17 You would go by a development right off of
18 another farm at a one unit per 20 acres on that and
19 bring it to your site.

20 Q Not including any TDRs, what is the maximum
21 residential intensity available on this farm?



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1 A In the Critical Areas, 19 units.

2 Q How about outside?

3 A Outside, I believe it's 50 to 60. I don't
4 know the exact number. It may be as high as 68, I
5 think. It's been a long time since I've looked at that.

6 Q What would be the cap using the maximum
7 number of TDRs?

8 A In the Critical Areas, roughly 173 units.
9 They would, of course, not be 20 acres on this site, but
10 they would be brought in at a one per 20 and clustered
11 on, depending upon how we got rid of the sewage,
12 individual lots.

13 John Knickerson and the Environmental Health
14 Department would probably recommend one-acre lots. If
15 we went with a community sewage system, we could break
16 them down to, I believe, 20,000 square feet.

17 MR. MURRAY: That's all of the questions I
18 have. Thank you.

19 CHAIRMAN CORKRAN: Mr. Murphy.

20 CROSS-EXAMINATION

21 BY MR. MURPHY:



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1 Q I'm sorry, Mr. Crowding, I didn't understand
2 this reference to 173 units. How did that come about?

3 A Under the TDR application, we fall back to, I
4 believe, it's Section 8103 of the Comprehensive Zoning
5 Ordinance, which will allow us to develop the land
6 instead of an 85 percent open space ratio, we are
7 reduced to a 50 percent ratio, and instead of -- I
8 forget what the net density is regularly, but it shoots
9 it up to a .9 percent. When you run those calculations,
10 you come up with 173 units.

11 The county says that you can do that because,
12 what you're doing on this particular piece of property,
13 they will allow you to stick out your 15 percent
14 impervious area, but you'll be protecting your open
15 space on the property of which you're taking those units
16 off of and accomplishing the same means.

17 Q Well, that's true of any property in the
18 county that you can transfer and increase the density of
19 it, right?

20 A Just the "ag" and countryside.

21 Q But there's a lot of "ag" and countryside



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1 property, I assume. It's a vast majority of the county,
2 isn't it?

3 A That's right.

4 Q What is the base zoning in the countryside:
5 one unit per how many acres?

6 A One unit per 20 in Critical Areas, which is
7 the 1,000 foot back.

8 Q I understand what we're doing in the Critical
9 Area and, really, your suggestions about increasing the
10 density and everything else, they don't apply to the
11 Critical Area at all, do they?

12 A Yes, sir.

13 Q They do?

14 A Yes, sir.

15 Q How can you increase the density in a Critical
16 Area beyond the one per 20 allowed by the Commission?

17 A Because on the overall picture, even though
18 you're developing more so on one particular piece of
19 property, you are, in turn, protecting the land that
20 you're dragging those units off of.

21 So, overall, it's still that one per 20. You



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1 may bring them all onto a site where you have the proper
2 infrastructure.

3 You may have a farm where you don't have great
4 perk, whereas another person may have a piece of
5 property that perks very well. He will then build that
6 one out.

7 Q Well, I understand the concept of
8 transferable development rights, but, I mean, isn't the
9 Critical Area limited to the one per 20?

10 A Yes, and the Queen Annes County ordinance says
11 you may transfer them on as long as you bring them in at
12 a one per 20. You can't bring a one-acre lot off of a
13 farm and have 19 acres on that left to develop. That
14 full 20 acres is gone. You use up all of his
15 development potential.

16 Q But if I have a farm in the Critical Area --
17 and assume, for the sake of argument, the whole farm is
18 in the Critical Area and it's 100 lots -- it's 100 acres
19 -- aren't I limited to five units on that farm?

20 A You're allotted to what you're allowed: five
21 units. You're allotted under the TDR application much



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1 more, and what we would have to do is take that
2 particular piece of property and run the Natural
3 Resource calculations to determine the particular number
4 of units that would be allowed on that particular piece
5 of property.

6 One 100-acre piece may not accommodate that.
7 You may end up with a 100-acre farm that's totally
8 wooded where you're resource protection factor is 80
9 percent, and you may not have enough buildable land to
10 bring those units on.

11 Q It's your understanding that the Commission
12 would allow a particular 100-acre property to be
13 developed -- assuming it's houses in the resource
14 conservation area -- to be developed at a density higher
15 than one per 20?

16 A A particular piece of property can, as long as
17 the piece that is being taken off of is protected, as
18 well, at that one per 20.

19 Q Are you sure you're speaking for what is
20 acceptable to the Commission and not just to Queen Annes
21 County?



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1 A It's in the Queen Annes County Comprehensive
2 Zoning Ordinance and the Critical Areas criteria, which
3 the Commission approved.

4 Q I see. So, the 173 units, would they be in
5 the Critical Area?

6 A Yes, sir, every one of them.

7 Q According to Queen Annes County?

8 A According to Queen Annes County.

9 Q On this site?

10 A On this site, if we could get them on there.
11 We're allowed to put them on there. I'm not saying they
12 could be put on there, but that is what you are allowed
13 under the ordinance.

14 Q Also, you're allowed a wide range of uses,
15 such as golf courses and swimming pools and tennis
16 courts and roller skating rinks -- all of these
17 institutional uses, right?

18 A Well, that's one of the -- in this case, it's
19 up to their discretion. The TDR isn't allowed --

20 Q I know that, but, I mean, in the countryside
21 zone, you are allowed all of these uses that I side,



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1 provided the Commission approves, isn't that correct?

2 A Yes.

3 Q Now, I don't live on the Eastern Shore, but I
4 hear these stories that nobody knows really what they
5 can develop because the Army Corps of Engineers has
6 changed their rules to some extent recently, and you
7 have this issue of hydric soils, and I'm told by
8 engineers I know that things are very much up in the air
9 until you do an actual study to determine the
10 development capability of a piece of property, isn't
11 that correct?

12 A On anything you walk on, just about, now.

13 Q Are you aware that this property has been
14 walked to determine its residential development
15 potential?

16 A I don't know whether it's been walked to
17 determine its residential potential or not, but I know
18 it's been walked many times.

19 Q I mean, by the Corps to determine its
20 residential development potential? The 173 units, I'm
21 just trying to find out: has the Corps okayed them?



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1 A No, the Corps hasn't okayed them. What we
2 would do is, we have had the Corps define what they are
3 going to consider nontidal wetlands, which encompasses
4 these hydric soils that everybody is up in the air
5 about and wondering whether you can or you can't on
6 them.

7 Prior to development, we would go in there
8 during the wet season and set pyzometers, and verify
9 those locations.

10 MR. MURPHY: That's all I have. Thank you.

11 MR. MURRAY: No other questions.

12 CHAIRMAN CORKRAN: All right. Thank you.

13 MR. MURRAY: I have three other witnesses.
14 All of them talk about water quality, basically, and
15 other related issues.

16 I would like to take them just like that, but
17 I think together, given the trend of cross, it's
18 probably going to take another 45 minutes to an hour to
19 complete them.

20 May we have a two or three minute break and
21 then just finish them up in one block?



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1 CHAIRMAN CORKRAN: Certainly.

2 (Whereupon, there was a brief recess.)

3 MR. MURRAY: Thomas King.

4 Whereupon,

5 THOMAS KING,

6 a witness, called for examination by counsel for the

7 Proponents, was duly sworn, and was examined and

8 testified as follows:

9 DIRECT EXAMINATION

10 BY MR. MURRAY:

11 Q Mr. King, please identify yourself.

12 A My name is Thomas King. I'm a senior
13 hydrogeologist with Earth Data, Incorporated.

14 Q Where is that business located?

15 A We have offices in St. Michaels, Maryland, and
16 Exton, Pennsylvania.

17 Q What is your educational background?

18 A I have a bachelor's in geology from Rutgers
19 University, and I'm currently completing a master's of
20 science and environmental sciences at the University of
21 Virginia.



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1 Q What has been your professional experience?

2 A I worked for three years with Annadril
3 Slumberge (phonetic) as a petroleum geologist in the oil
4 fields of South Texas; four years as an environmental
5 consultant in New Jersey, Virginia, Delaware, and
6 Maryland.

7 Q How long have you been with Earth Data?

8 A About three years as senior hydrogeologist.

9 Q In connection with your work as a
10 hydrogeologist, do you deal with water quality issues on
11 the Eastern Shore?

12 A That's the principal avenue of my work. In
13 addition, water supply and contaminant studies.

14 Q Have you had any exposure to the site which is
15 the subject of this proceeding?

16 A Yes, I have. In addition to work performed
17 for this site, which I'll detail, I have also had
18 occasion to be on the site for other projects, which
19 included the identification of geologic formations to
20 depths of approximately 800 feet. I've made numerous
21 soil investigations around the site.



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1 In the course of this project, we've reviewed
2 the site geology and hydrogeology, installed three
3 separate wells on various locations around the site and
4 described the profiles of these wells, obtained water
5 quality samples from them.

6 Also, reviewed the golf course design,
7 construction, and proposed management practices, and
8 used various analytical techniques to determine the
9 impact of the golf course and other proposed uses --
10 specifically, fertilization -- on the shallow ground
11 water.

12 Q What results have your investigations shown
13 and what conclusions do you draw about water quality
14 here?

15 MR. MURPHY: Is he being offered as an expert?

16 MR. MURRAY: Yes.

17 MR. MURPHY: I have no objection.

18 THE WITNESS: In general, the results are --
19 well, with regard to soils, the soils are somewhat
20 variable -- highly variable throughout the site, and
21 they generally consist of sands, silts, and clays of the



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1 Matapeck (phonetic) -- sassafras and Woodstown types.

2 The general description given in the SCS Queen
3 Annes County soil map are accurate.

4 We have, from the wells, determined that the
5 ground water, as late as approximately two weeks ago,
6 occurred at elevations between two and five feet in
7 these three specific locations -- I'm sorry -- depths
8 below ground surface, not elevations.

9 The nitrate-nitrogen concentrations in the
10 water samples recovered from these wells was 6.9, 10.0,
11 and 15.0 milligrams per liter. This is presumably the
12 result of nitrate contamination due to past agricultural
13 practices.

14 Also, have taken the data provided to us by
15 the golf course designer, which indicates the proposed
16 fertilization schedule, irrigation schedule at this
17 site, and applied a simple analytical model developed by
18 the Environmental Protection Agency, which takes into
19 account nitrate-nitrogen -- or, rather, nitrate or
20 nitrogen inputs from such sources as fertilization,
21 rainfall, sewage application, balances those against



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1 outputs in the form of crop uptake, percolation, various
2 chemical processes, and then predicts the concentration
3 of nitrate, or nitrogen or nitrate in the percolate, as
4 it would move through the unsaturated zone and enter
5 into the ground water.

6 The results of that indicate that the
7 percolate nitrate-nitrogen concentrations would be
8 between zero and 8.5 milligrams per liter during the
9 period -- approximately six-month period when fertilizer
10 will be applied at the site.

11 For the majority of the time that fertilizer
12 is applied, the crop will have a greater consumptive use
13 of nitrate-nitrogen than the application and operate at
14 a deficit. Only during three months will the nitrate-
15 nitrogen in the percolate be greater than zero, and in
16 all of those times it is less than the ten milligrams
17 per liter mandated by the state and EPA water quality
18 standards.

19 The basis for that model is, as I said, the
20 proposed fertilization schedule provided by the golf
21 course designer, and that includes approximately an



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1 average nitrate-nitrogen loading of 107 pounds per acre
2 per year, which is an average for the proposed site.

3 It doesn't take into account the dilution of
4 any type of chemical species once it enters the ground
5 water -- and that's very significant. We're talking
6 about the concentration of the water as it comes from
7 the unsaturated zone into the saturated zone.

8 The concentration of that water will be
9 greatly diminished as it is diluted by the existing
10 ground water. The area in which that will take place is
11 highly variable. It depends on the location and the
12 site, the depth of the ground water, the depth of the
13 local flow system, but it is very significant to note
14 that this nitrate concentration as it enters the ground
15 water is much higher than would be expected at some
16 distance from the area where the nitrate enters the
17 ground water. As it moves laterally, it will become
18 part of a much larger flow system, which would tend to
19 move.

20 The water table at this site, as I mentioned,
21 was between two and five feet at those three locations.



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1 Obviously, in other locations, it's much different. In
2 the areas of wetlands, it's at the ground surface; in
3 other upland areas, it's much deeper.

4 The ground water flow system, which has
5 previously been described as very complex, I think is
6 probably more simple than that. As Dr. Brinsfield
7 indicated, the ground water flow system can be described
8 as a balance between inputs and outputs: inputs in the
9 form of rainfall, irrigation; outputs in what leaves the
10 ground in ET and then what moves laterally to points of
11 ground water discharge, which are streams or other
12 surface water bodies.

13 There is no question that a portion of the
14 water which enters the site at the ground surface moves
15 off into the Little Queenstown Creek, Queenstown Creek,
16 Chester River, and potentially -- we can't be sure with
17 the limited data -- down into the tributaries of the Wye
18 River, as well.

19 The magnitude of that is currently unknown.
20 However, it is very clear that that is the direction of
21 ground water movement into those nearby surface water



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1 bodies.

2 The key to an understanding of the impact of
3 the affect of the fertilization is not so much how the
4 run-off -- the component of run-off comes into play. By
5 far and away, the biggest component of any assessment
6 here is how the ground water -- how the shallow ground
7 water system responds to nitrogen inputs.

8 There has been a lot of testimony that the
9 water quality of surface water bodies will be degraded
10 by the application of nitrogen fertilizer or other
11 contaminants or elements of the ground surface.
12 However, they have failed to address the type of
13 transport and the nature of the flux across the
14 unsaturated-saturated.

15 So, certainly, if something gets into the
16 creek that is toxic to the Wyoda (phonetic), it is bad,
17 but how did it get from -- what is the link between the
18 application of the ground surface and the ground water
19 system that it goes into? That hasn't been
20 demonstrated.

21 As Dr. Brinsfield pointed out -- and I think



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1 he made a very good demonstration of the general ground
2 water flow system at the site -- the use of a turf
3 system, as opposed to an agricultural system will tend
4 to decrease run-off. In so doing, it will increase
5 infiltration.

6 He also pointed out quite correctly that at
7 certain points in the proposed golf course, the
8 fertilizer input is roughly the same as it would be in
9 an agricultural setting -- and, possibly, the current
10 agricultural setting.

11 He also pointed out quite correctly that the
12 typical golf course fertilization scheme would tend to
13 spread out that nitrogen or that fertilizer application.

14 So what he has pointed out is that you have
15 increased infiltration -- more water -- roughly the same
16 amount of fertilizer, as you would in an agricultural
17 setup, which is spread out over a greater period of
18 time, which clearly demonstrates that the -- to put this
19 in perspective, the nitrate concentrations in the
20 infiltration from a golf course situation would be lower
21 than you would expect in a fertilized and irrigated or



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1 even nonirrigated cropland.

2 As, I believe, it was Dr. Jacobs pointed out,
3 it reinforced Dr. Brinsfield's assertion: the solution
4 to pollution is dilution. If you just take those
5 arguments, it's clear that the golf course application
6 would tend to dilute the input considerably more than a
7 short-term, nonirrigated agricultural -- fertilizer.

8 There have been several assertions made that
9 the soils here are sandy, very sandy, somewhat sandy. I
10 think the indication that the soils are sandy at all is
11 incorrect. The evidence presented by the Soil
12 Conservation Service and by previous witnesses indicated
13 quite the opposite.

14 There are little or no soils on this site
15 which could be classified as sandy. In fact, in soil
16 tract characteristics at proposed hole locations, which
17 were presented earlier, indicates that almost no soil
18 can be considered sandy.

19 The descriptions here range from lightly silty
20 clay loam, silty clay loam, sandy loam, loamy sand. I
21 see the occasional entry -- maybe one percent of these



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1 entries say "sand." That is what a "sand" is: a sand is
2 a sand. "Sand" is not a sandy loam.

3 A "loam," by definition, contains roughly
4 equal mixtures -- equal parts of silt, clay, and sand.
5 Just because it says "sandy loam" or "loamy sand," it is
6 by no means a "sand" and should not be treated as such.
7 These are very different things.

8 The inclusion of as little as five percent
9 clay in an otherwise pure sand dramatically decreases
10 its ability to transmit water. If you have a pure sand
11 with five percent clay, you will have a piece of
12 geologic material that behaves very differently than
13 just plain sand.

14 That is clearly what you have at this site. I
15 don't think that there is any uncertainty that you could
16 -- there is no uncertainty in the descriptions here to
17 indicate that there is a potential that this site may be
18 sandy. All evidence in the Soil Conservation Service
19 report and my own investigations on the site indicate
20 that it is anything but that.

21 In fact, the areas on the Eastern Shore that



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1 can be characterized as "sandy" and not "loamy" are rare
2 indeed, especially areas in this locale where the
3 surface sediments are comprised by what is known as the
4 Talbot or Kent Island formations. They're anything but
5 sandy.

6 Also, the soils here at the site have been
7 described as similar to soils found in four golf courses
8 in the previously mentioned studies in Cape Cod. I
9 would like to suggest that as a geologist familiar with
10 the hydrogeology and the geology of Cape Cod, as well as
11 the geology and hydrogeology of this area, that nothing
12 could be further from the truth.

13 Even a casual review of the documents
14 presented by the USGS and the information contained in
15 the Soil Conservation Service would indicate that these
16 are completely different environments. The soils are --
17 it's not even like comparing apples and oranges. It's
18 like comparing apples and something that's not fruit.
19 They're very, very different.

20 In fact, the soils on Cape Cod are literally a
21 textbook example of a high conductivity, very highly



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1 permeable aquifer, the type of which is not common
2 anywhere. This is a glacial out-launch plane.

3 These types of environments are somewhat
4 common in New England, unheard of in this area. The
5 depositional environment that lay down the sediments in
6 Cape Cod have never been seen in this area. It's
7 completely untrue that they are anywhere remotely alike.

8 If you compare the hydraulic properties of the
9 aquifers on Cape Cod with the aquifers here, let's say,
10 a general parameter of hydraulic conductivity may vary
11 by a factor of ten to several hundred times between the
12 typical sediment you see at the Queenstown-Harbor Golf
13 Links and what you would see at those golf courses on
14 Cape Cod -- dramatically different -- night and day.

15 The assertion that there was some significance
16 and it was applicable to this case that nitrate-nitrogen
17 levels increased 14 to 25-fold in some of the wells in
18 the Cape Cod study is not only illogical in that it has
19 no bearing, it's also unscientific and it cannot be
20 applied anywhere except in that one location.

21 That argument requires that you compare the



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1 nitrate concentrations after irrigation of the golf
2 course with something wholly unrelated to that, which is
3 the prior concentration of nitrate-nitrogen.

4 I would submit that you could take a situation
5 in Cape Cod, which may cause a 10,000-fold increase in
6 nitrogen concentrations in the ground water, apply those
7 same practices here, and have no measurable impact.

8 If you were to have initial nitrogen
9 concentrations of one part in 10,000 and you brought
10 them up to one in 100, you have increased it tenfold.
11 However, you haven't degraded -- necessarily degraded
12 the ground water resource, and you cannot apply that
13 anyplace else because it depends on something which is
14 wholly unconnected to the input to that system.

15 You're taking an antecedent condition, which
16 has no bearing -- it has no connection with what the
17 input was here. You're comparing, again, apples and
18 oranges. It has no bearing whatsoever, and it cannot be
19 applied here.

20 So, the attempt to use a 14 or 15 to 24-fold
21 increase as an evaluator or a potential "red flag," if



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1 you will, as to this site, is wholly without scientific
2 basis. It does not follow logically, and it is a misuse
3 of that data, essentially.

4 The other assertion that there is a potential
5 for saltwater intrusion if the ponds are used as sources
6 of irrigation water, in an order of magnitude analysis
7 it does not become really a problem. On a typical day,
8 roughly 2,000,000 gallons' worth of water fall on an
9 area the size of that farm, if we assume roughly 40
10 inches a year. You get 2,000,000 gallons a day of
11 rainfall falling on it every single day, day in and day
12 out, on a typical day.

13 The number quoted before, 35,000 gallons per
14 day, which I believe reflects the average use during a
15 month of maximum use as permitted by or requested from
16 the State Water Resource Administration, represents less
17 than two percent of the amount of water which falls onto
18 this site in a given day, the greater -- the 2,000,000
19 gallons a day.

20 Additionally, that water does not represent a
21 net loss to the aquifer. It is water which may be taken



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1 out of a shallow pond, applied to the ground surface;
2 some of that will reinfiltre the ground.

3 Although we haven't evaluated the potential
4 for saltwater intrusion, intuitively, I've been involved
5 in research in saltwater intrusion in the past, and I
6 feel very confident in saying that it would take a much
7 greater withdrawal -- many orders of magnitude more than
8 this -- to induce saltwater intrusion or saline water
9 intrusion from any of the bays nearby -- the surface
10 waters nearby.

11 This site will not notice the loss of 35,000
12 gallons per day, nor will it really notice the addition
13 of 35 gallons a day for irrigation --

14 Additionally, certain assertions were made
15 about the performance of the site relative to the soil
16 conditions. It's been said that if these were sandy
17 soils, they would be very poorly suited to fertilization
18 because sandy soils would allow the nitrate-nitrogen or
19 other pesticides or whatever to rapidly infiltrate and
20 that clay soil would be much more beneficial.

21 Well, a proper definition or proper reading of



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1 the -- or, rather, a proper interpretation of the data
2 submitted in the case that the soils contain a
3 significant amount of clay loams -- typically, 30
4 percent -- and you have that here.

5 Therefore, I feel that the potential for rapid
6 infiltration is very small. In fact, there is other
7 soil types identified by the USDA Soil Conservation
8 Service. They indicate that the sandiest soils on the
9 site are sassafras sandy loam -- loam, again -- roughly
10 30 percent clay, 30 percent silt -- and Gaylestown
11 (phonetic) sandy loam -- again, sand -- roughly 30
12 percent, 30 percent silt.

13 Just a quick quote from the USDA Soil
14 Conservation Service Queen Annes County soil survey:
15 "Sassafras sandy loam," the sandiest soil, I believe,
16 that is going to be developed for the golf course, "It
17 is a well-drained soil and holds moisture and plant
18 nutrients well."

19 So, this is your, I believe, from my reading
20 of the maps, the most sandy soil that will be used as a
21 golf course area, and it is defined as a "well-drained



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1 soil that holds moisture and plant nutrients well."

2 Clearly, these are not well-drained or
3 excessively well-drained; they're not sandy, by any
4 means. The application of hydraulic characteristics
5 from Cape Cod is irrelevant and has really no bearing on
6 this site, although the conclusions of that report,
7 which looked at an area which was very vulnerable to
8 contamination, concluded that contamination was not an
9 issue at golf courses, even in very vulnerable areas
10 like that.

11 BY MR. MURRAY:

12 Q Mr. King, how do you compare the existing
13 nitrate situation to what your model shows would be the
14 case if it's converted to golf course turf?

15 A Well, if you had an existing condition that is
16 somewhere between -- well, let's say an average is ten,
17 which it roughly does, milligrams per liter and you have
18 a maximum input of 8.5 milligrams per liter, other
19 inputs that are less than five, it's clear that by
20 mixing those two together, you will come up with a more
21 dilute or an average mixture somewhere between ten and



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1 five, or who knows, but something less than ten.

2 Q For the purposes of your model, did you assume
3 that there would be fertilization of the roughs?

4 A Yes. As a matter of fact, that's something I
5 wanted to point out. I believe Dr. Brinsfield, when he
6 looked at his nitrogen loading and said that the
7 nitrogen for the fertilizing loadings were the same for
8 a farm as they were for this site. That's true for the
9 greens, tees, and fairways.

10 If you also take into account the roughs,
11 which are a significant portion of the golf course --
12 they're fertilized at a much lower rate -- you come down
13 to a fertilizer input of roughly half of what you would
14 see at -- you know, it would be around 107 pounds per
15 acre per year versus the approximate 200 pounds per acre
16 per year for a typical agricultural setting.

17 Q If the roughs were not, in fact, fertilized,
18 that would reduce the post golf course construction
19 loading rate even further?

20 A Dramatically.

21 MR. MURRAY: That's all of the questions I



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1 have. Thank you.

2 CHAIRMAN CORKRAN: Okay. Mr. Murphy.

3 CROSS-EXAMINATION

4 BY MR. MURPHY:

5 Q Mr. King, this model, do you have it there?

6 A No, it's a numerical model that -- I have it
7 programmed on computer. It's not something I could
8 really carry around.

9 Q Do you have the data or --

10 A Well, the citation is the "Process Design
11 Manual for the Land Application of Municipal
12 Wastewater," Environmental Protection Agency, 1983.

13 Q I mean, do you have a record of what the
14 figures were on the inputs and the various things you
15 used for it? Is there a written report that this
16 generated or --

17 A What I have is just an output -- a table
18 output that indicates essentially what I've indicated
19 here. It does not go into the algorithm behind each one
20 of these calculations because that's fairly complex, and
21 you would have to go to the citation that I gave you in



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1 order to be able to get that.

2 MR. MURPHY: Let me just say something to the
3 Commission. I really feel at a disadvantage here. He
4 is testifying on the basis of this model and this
5 information he put into it and that sort of thing, and I
6 don't understand this. Perhaps Mr. Murray does, but I
7 don't.

8 The only thing I can do, frankly, is take the
9 information and give it to somebody like Dr. Brinsfield
10 and say, "Can you look at this?" I really need that
11 opportunity.

12 CHAIRMAN CORKRAN: Why can't you do that
13 between now and the time you prepare your summation?

14 MR. MURPHY: Well, that would be fine if I
15 could get the model and those --

16 THE WITNESS: Well, I don't have to give you a
17 model. It's public domain. It's generated by the
18 Environmental Protection Agency, and the inputs were as
19 I told you: roughly 107 pounds per acre per year of
20 nitrate-nitrogen. There is a -- uptake component of 260
21 pounds per acre per year.



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1 MR. MURPHY: What is it?

2 THE WITNESS: Two hundred and sixty pounds per
3 acre per year for an average -- turf grass -- or
4 bluegrass, rather, and that's on a temperature -- it's
5 proportioned throughout the year on a temperature basis,
6 typically.

7 MR. MURPHY: Would you object if Dr.
8 Brinsfield called you and you could explain it to him?

9 THE WITNESS: Not at all.

10 MR. MURPHY: He had to go. He had to go out
11 of town. I'll do that, then.

12 CHAIRMAN CORKRAN: Do you have any problem
13 with that, Mr. Murray?

14 MR. MURRAY: I'm not sure exactly what it is
15 that's being proposed. I, on behalf of my client, have
16 no problems with any conversations between any of the
17 experts on this side of the table and any of the experts
18 on this side of the table; and if that's what is being
19 suggested, I have no problems.

20 MR. MURPHY: With that, I appreciate the
21 ability to do that, and what I propose to do is have Dr.



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1 Brinsfield prepare a report analyzing the information,
2 as he is able to derive it from Mr. King, and we'll
3 submit that with our material.

4 With that remark, I'll just read over my notes
5 here and see if there is anything else I want to ask Mr.
6 King.

7 BY MR. MURPHY:

8 Q Dr. Brinsfield testified that dilution,
9 although it, as I understand it, reduced the
10 concentration of the nitrate -- the nitrogen in the
11 water, dilution doesn't necessarily reduce the total
12 loading of the nitrogen in the system. Is that correct?

13 A No, it can't. That's true. I mean, the
14 loading is the loading, and dilution is the loading
15 divided by whatever it goes into.

16 Q So, in a thimble, it has one degree of
17 concentration; in a gallon bucket, it has a different
18 degree of concentration, but it's the same amount?

19 A Right. That's the difference between the
20 volume or the mass and the concentration.

21 Q If you're concerned about the existing, as I



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1 understand it, overenriched condition of Queenstown
2 Creek from nutrient loading, then the dilution rate
3 doesn't make any difference, does it?

4 A No, because the loading to the creek is based
5 on the concentration in the ground water as it gets to
6 the creek. If you decrease the concentration in the
7 ground water, you will decrease the loading to the
8 creek.

9 Q It could be diluted, but it's still the same
10 amount, am I right?

11 A No, a lower concentration equals a lower
12 amount.

13 Q I understand that, but the same concentration
14 will get diluted as it hits larger water bodies and get
15 diluted, but it's still the same amount?

16 A Yes, the mass is something you can't take away
17 from it, no matter what you put it in, but the loading
18 to the surface water body is based on the concentration
19 in the ground water. If the concentration in the ground
20 water decreases, the loading to the creek decreases.

21 Q I guess this model addressed -- in other



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1 words, this model addressed the whole question of
2 nutrients leaching down into the ground water, right?

3 A What it does is it takes the input at the
4 ground surface, someplace between the ground surface and
5 the water table it factors in outputs from that system,
6 based on plant uptake, various chemical processes, and
7 then what you're left with is what concentration it will
8 be when it gets to the water.

9 Q When it hits the ground water?

10 A Exactly.

11 Q Are you confident that all of the necessary
12 studies have been done now?

13 A I am in no way qualified to make any
14 characterizations of the water quality of the surface
15 water streams. I have no data on that. I have no data
16 whatsoever with regard to the ground water on the golf
17 course site.

18 I think it's sufficient to note that the
19 current practice of agriculture has produced certain
20 conditions in the creek, and it appears that changing
21 that land to a golf course setting, with regard to the



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1 fertilizers, will decrease the nitrate loading to the
2 ground water.

3 Q Did you analyze pesticides?

4 A No.

5 Q Are you aware that the Critical Areas
6 Commission has provided that agricultural lands are
7 deemed to be a protective use and should be encouraged
8 in the Critical Area?

9 A Well, I'm not really familiar with the
10 Critical Areas legislation.

11 Q You're making the point that you think this
12 golf course would have less nitrates going in than
13 agricultural land?

14 A Yes. Also, there are other factors about a
15 golf course, as opposed to a farm, which just from
16 personal experience -- viewing these things around the
17 Eastern Shore -- golf courses aren't tilled more than
18 once a year. The sediment load, I believe, would also
19 decrease from a golf course, as compared to an
20 agricultural environment.

21 Q Do you think it would be useful to do base



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1 line studies of the existing water quality of Queenstown
2 Creek to determine what the effect of nutrient loadings
3 would be?

4 A I think you would have a very difficult time
5 factoring out the current conditions and trying to
6 determine how you would be able to project that and
7 evaluate this golf course.

8 The conditions that exist now, I would assume
9 have been there for tens of years -- the agricultural
10 conditions -- and those aquatic environments are fairly
11 complex.

12 The data couldn't hurt, but I don't see how
13 you could make believe from that to being able to
14 evaluate the golf course from that data. The antecedent
15 history would only compound it.

16 Q You mean in trying to compare it to the
17 existing agricultural use?

18 A Yes.

19 Q I didn't quite understand what you were saying
20 about the soils. I mean, a lot of these soils listed in
21 the soil survey are sandy, in part, are they not?



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1 A In part, but as I indicated, it doesn't take
2 much clay to dramatically alter the hydraulic properties
3 of the soil, and that was the whole --

4 Q Does your model deal with these soils? Is
5 that the idea?

6 A No, it does not. That's another thing that
7 makes it somewhat conservative: that it just assumes
8 that once it gets through the root zone and it's taken
9 up by the plants, it enters the ground water.

10 Q But you wouldn't agree that some soils are
11 definitely more able to retain the nutrients than
12 others, and that when you have sandy soils, you have a
13 higher degree of infiltration than you would with
14 strictly clay soils?

15 A Yes, sir. Yes, the sandier the soil, the
16 greater the infiltration.

17 Q Also, the infiltration is related, too, to the
18 water table, is it not?

19 A Well, no, the infiltration rate is measured on
20 unsaturated conditions and that has -- the level of the
21 ground water has no other bearing on that.



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1 Q But aren't I right, though, in thinking that
2 if the water table, say, is 30 feet below the surface,
3 that there is more opportunity for the nitrogen to not
4 reach the ground water?

5 A Well, once the nitrogen passes below the root
6 zone --

7 Q It's going to get --

8 A -- it's going to get to the ground water
9 because there are no processes, or very few that take
10 place in the zone between the bottom of the roots and
11 the top of the ground water to act on.

12 Q Well, if that's the case, what difference does
13 it make what type of soil it is?

14 A Well, because the soil that is less
15 impermeable will keep it in the root zone quite a lot
16 longer. A sand, the water will be --

17 Q Keep it in the root zone?

18 A It will keep it in the root zone longer, aside
19 from the sand taking it right through.

20 My critique of this was to indicate that as
21 being misinterpreted and that these soils were being



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1 classified as "sandy" when they are not at all that.

2 Q I'm sorry. Just tell me once more what the
3 name of this model is.

4 A Well, I don't believe it has a name, but the
5 citation is "EPA Process Design Manual."

6 Q That's it?

7 A No, I'm sorry, "for the Land Application of
8 Municipal Wastewater." I believe the most current is
9 1986, and I think I take my reference from the 1983
10 version because it's in English, as opposed to metric.

11 Q And that, really, you sought to analyze with
12 the use of that model the passage of nitrogen from the
13 surface down to the ground water. Is that what the
14 model was showing?

15 A The nitrogen balance, essentially, is what it
16 shows: what is the effect of plant uptake?

17 Q How much plant uptake you have?

18 A Yes.

19 Q That's basically what it shows?

20 A And how it's partitioned. That's important.

21 Reed canary grass may have a nitrogen uptake of 350



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1 pounds per year, but if you put a considerably smaller
2 portion -- a low portion of nitrate fertilizer on the
3 reed canary grass at a certain point of the year, that
4 may contribute to the nitrate leaching into the ground
5 water.

6 Q Basically, what the model shows, I guess, is
7 that the plant uptake of turf is higher than crops and,
8 therefore, there will be less going to the ground water?
9 Is that what it shows?

10 A No, not necessarily. There are crops that
11 have considerably higher plant uptake than turf grass.
12 I think the significant portion of this is that this is
13 applied over a longer duration.

14 Q What is applied?

15 A The fertilizer, as opposed to an agricultural
16 setting where it's generally applied once. In mist,
17 it's applied in various cycles throughout the growing
18 season.

19 So there are -- well, I'm sorry. To answer
20 your question, yes, there are crops that have a larger
21 nitrogen uptake than turf grass.



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1 Q But, I mean, why does the model show less
2 nitrogen getting to the ground water? Is it because
3 you're spreading it out over time? Is that the idea?

4 A Well, because if you look at it -- I looked at
5 this on an average for the site, and it was spread out
6 over -- as was indicated, that it was spread out over a
7 longer period of time. That is the process that was
8 indicated by the golf course designer.

9 Q I mean, but what difference does that make,
10 whether it's spread out or its concentrated?

11 A Because if, let's say, a crop can take up 100
12 pounds per acre over the course of its growing season --
13 and, let's say, it's growing season is five months --
14 that's 20 pounds per acre per month.

15 If you put on 50 pounds per acre in one month,
16 you'll have a net loss to the soil of roughly 30 pounds.

17 If you spread that out 100 pounds per acre
18 over the growing season and you do it in such a fashion
19 as to enhance uptake, then you could take that 100
20 pounds and have none of it go to the ground water.

21 I mean, if I were to fertilize this field in



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1 the winter months, the results would be dramatically
2 different than if I were to fertilize it in the summer
3 months.

4 MR. MURPHY: Thank you.

5 CHAIRMAN CORKRAN: Is that all, Mr. Murphy?

6 MR. MURPHY: Yes, that's all.

7 MR. MURRAY: No other questions.

8 CHAIRMAN CORKRAN: Thank you.

9 MR. MURRAY: Steve Roy.

10 Whereupon,

11 STEPHEN ROY,

12 a witness, called for examination by counsel for the
13 Proponents, was duly sworn, and was examined and
14 testified as follows:

15 THE WITNESS: For the record, my name is
16 Stephen Roy, spelled R-O-Y.

17 DIRECT EXAMINATION

18 BY MR. MURRAY:

19 Q Mr. Roy, where are you employed?

20 A I am the director of the Washington operations
21 of the firm of Horsley, Witten, Hegemann. We have an



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1 office at 300 "I" Street in Washington, D.C., and also
2 an office on Cape Cod, Barnstable, Massachusetts, and in
3 Cambridge, Massachusetts.

4 Q What is your profession?

5 A I'm an environmental science water resource
6 planner. A ground water protection specialist,
7 basically.

8 My profession derives from a number of years
9 that I have worked both on the federal level, state
10 level, and county level in this field.

11 My background is that I have worked for two
12 years for the Environmental Protection Agency in the
13 Office of Ground Water Protection where I managed the
14 well-head protection program designed to protect public
15 water supplies and to assist state and local governments
16 in developing programs to protect water supplies.

17 Prior to that, I developed the ground water
18 protection program for the state of Massachusetts where
19 I manage that program. It's a program that was very
20 large indeed and resulted in major efforts that are
21 noted nationally for ground water protection.



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1 Q What has been your professional experience,
2 then, if you would chronologically run through it? I
3 know you covered some of it just then, but would you
4 cover the gaps.

5 A A couple of the gaps that are there are I
6 recently joined this firm within the last four months,
7 opened up an office in the Washington area.

8 The only other item that I can add to this
9 would be I have served in a local capacity as the
10 chairman of a planning board in Amesbury, Massachusetts.
11 That was an elected position -- an elected position
12 where I oversaw the zoning and subdivision control,
13 ordinances and town ordinances pertaining to
14 development.

15 Prior to that, I worked at a regional planning
16 agency as an environmental planner. That was back in
17 1979-1981. During that time, I reviewed a number of
18 projects throughout our area of jurisdiction, which was
19 western Massachusetts.

20 While I was employed for the state in
21 developing the ground water program for the state, I



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1 literally reviewed thousands of projects and their
2 impacts on ground water quality.

3 Myself or my staff -- a staff of
4 hydrogeologists, and biologists, and soil scientists --
5 have reviewed different types of golf course settings,
6 different types of wastewater disposal settings, water
7 withdrawal allocation situations.

8 Specifically related to golf courses, I have
9 been involved in the review of one specific golf course
10 and the design to insure that it did not impact a public
11 water supply, and I have assisted the Golf Course
12 Superintendents of America in their understanding and
13 application of the water withdrawal regulations in the
14 state of Massachusetts and how they would apply to golf
15 courses.

16 Our firm, in terms of corporate capabilities,
17 we have very extensive experience in the review of golf
18 courses and their impacts on water resources. The
19 information that was submitted today -- the Cape Cod
20 study -- members of our firm have been involved in the
21 collection of some of the information that went into the



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1 development of that study.

2 We continue to serve local governments on Cape
3 Cod in the review of their golf course impacts on water
4 supplies, and also the assistance to golf courses
5 themselves in assessing their impacts on water
6 resources.

7 Q In that assessment, do you consider both
8 pesticides, herbicides, and fertilizers?

9 A That's right.

10 MR. MURRAY: I think Mr. Roy is qualified as
11 an expert on water quality issues.

12 MR. MURPHY: I have no objection.

13 BY MR. MURRAY:

14 Q Mr. Roy, have you had any occasion to
15 investigate the site of this golf course project and
16 consider the plans for it?

17 A Yes, we've had the opportunity, and I
18 personally reviewed the planning specs for the design of
19 the golf course. We have also reviewed the material
20 that has been prepared, the environmental impact study,
21 and the proposed Best Management practices for the site.



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1 In addition, we've been asked to develop a
2 nitrogen loading analysis of this site. It compliments
3 the work that was done by Mr. King, and I would say it
4 agrees with the conclusions that he draws that the level
5 of nitrates in the ground water by converting this site
6 from agricultural use to a golf course will actually
7 improve ground water quality by lowering the levels or
8 the concentrations of nitrates in the ground water
9 significantly.

10 Q Did you do some sort of modeling to make that
11 assessment?

12 A Yes, we have. Our firm has published --
13 developed its own model to assess nitrogen loading
14 impacts from land activity, such as golf courses, and
15 we've used this model on golf courses in the past.

16 We applied this model to this particular site
17 in a very conservative -- with a very conservative input
18 of parameters.

19 This model, I should say, has been published
20 in professional journals and presented at professional
21 associations, and is regarded as one of the state-of-



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1 the-art models in determining nitrogen loading.

2 We are also applying it -- one of our clients
3 is Buttermilk Bay, which is one of the coastal estuaries
4 -- part of the national estuary program. We're applying
5 this model to Buttermilk Bay, part of Massachusetts Bay,
6 to assist them in determining nitrogen loadings to
7 coastal environments.

8 One other point to add before I get into the
9 details of the model is that all of the golf courses
10 that we have evaluated have been in coastal settings,
11 and they've been in very vulnerable hydrogeology, as
12 well, much more than the site here that we have
13 investigated.

14 I also agree with Mr. King's assertion that
15 the soil type at Cape Cod is not similar at all to the
16 soil type that we find on the site here. The Cape Cod
17 situation is very coarse sands and gravels.

18 In fact, the vegetation type that you see
19 there reflects it. It's a very dry condition, and you
20 will pitch pine and scrub oak throughout site. They're
21 a very dry site species. Water does not last at all on



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1 the site. In fact, ground water velocities have been
2 measured at some of these golf course sites at 45 feet
3 per year -- excuse me -- 45 feet per day, which is very
4 rapid ground water movement, and it's some of the most
5 rapid ground water movement that you'll find anywhere in
6 the country.

7 The ground water velocity at this site can
8 nowhere reach that, and you can see by the vegetation
9 types that are on the site that the soils do retain
10 moisture, do have clay content, do have high organic
11 matter content, and, as such, will create a much better
12 environment for impeding the movement of infiltration of
13 precipitation into the ground water and the uptake of
14 the nutrients and utilization of pesticides by the
15 vegetation.

16 I can go into the details of the model.

17 Q Would you explain your model and the
18 assumptions you made, real quick.

19 A The assumptions that go into our model, as I
20 mentioned, are very conservative and really represent
21 what I would consider to be a worst case scenario.



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1 Q Before you do that, you prepared a report?

2 A Yes, I did.

3 Q And you're referring to it?

4 A Yes.

5 Q May I have an extra copy to give to the
6 Commission?

7 (Whereupon, there was a discussion off
8 the record.)

9 THE WITNESS: The summary of the model is
10 actually found between page five and page six. What we
11 have done here is, based upon our review of the
12 literature --

13 MR. MURRAY: Let's get it into the record
14 before we go further. Mr. Murphy, do you object to it?

15 MR. MURPHY: No.

16 THE WITNESS: Is it submitted?

17 CHAIRMAN CORKRAN: And perhaps you don't have
18 to read it all. We can read it.

19 THE WITNESS: No, I won't. I'll quickly go
20 through this.

21 (Whereupon, Mr. Roy's report was marked



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1 for identification as a Citizens' exhibit and received
2 in evidence.)

3 THE WITNESS: The basis behind this model is
4 about 6,000 water quality samples on Cape Cod to
5 establish background levels of nitrogen. That's the
6 calculation that goes into our estimate of
7 concentrations of natural land, that precipitation
8 itself contributes nitrogen to the ground water, and
9 that's how you get to some of these background
10 concentrations that were mentioned here.

11 MR. MURPHY: Excuse me. Where are you reading
12 from?

13 THE WITNESS: I'm not reading from anything.

14 MR. MURPHY: Is this not contained in the
15 report?

16 THE WITNESS: No, it's in the report.

17 MR. MURPHY: Where is it?

18 THE WITNESS: Background concentration, I'm
19 trying to find it. Just a second, please.

20 Well, the report does not refer to the
21 background application rate directly, but the references



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1 do, and those references that are related here are the
2 Horsley and Moser, 1990, "Monitoring Ground Water for
3 Pesticides at a Golf Course: A Case Study on Cape Cod,
4 Massachusetts."

5 MR. MURPHY: I'm sorry. What page is that?

6 THE WITNESS: Reference page, page seven.
7 Horsley and Moser, 1970 to 1990, "Monitoring Ground
8 Water for Pesticides at a Golf Course: A Case Study on
9 Cape Cod, Massachusetts," and the article Nelson,
10 Horsley, Campareri, Geggi, and Net, 1988, "Predicting
11 Nitrogen Concentrations in Ground Water and Analytical
12 Model," National -- Associations.

13 CHAIRMAN CORKRAN: Mr. Roy, Mr. Murphy may
14 want to quiz you on the details of this report. What I
15 want you to do is explain the model in very simple,
16 brief terms hitting the key assumptions, and then we
17 worry later about where the references are in the
18 report. Okay?

19 THE WITNESS: Fine. The model is basically a
20 nitrogen loading analysis, as well as a water budget,
21 and it takes into account the conditions at this site



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1 under a worst case scenario.

2 For example, we have used a discharge rate
3 from the sewage facility at 7500 gallons per day, which
4 is the maximum design capacity, not the average daily
5 flow of 5,000 gallons per day. That's factored into
6 this model as a worst case scenario.

7 In addition, we also model inputs of nitrogen
8 from not only the active management areas -- the greens,
9 tees, fairways, and roughs, which we don't believe
10 should be an active management area -- but also the
11 input from natural land and impervious surfaces.

12 All of those factors are taken into account
13 with the infiltration or the amount of recharge that can
14 occur on this site.

15 Again, on the recharge, we have been very
16 conservative. We've used low recharge rates. The
17 higher the recharge rate, the more dilution on the site.
18 So we used low recharge rates.

19 The bottom line is, based upon the loading
20 that we see to this site from nitrogen inputs from all
21 sources, as well as the recharge to the site from not



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1 only precipitation but from irrigation on the site, we
2 predict the average concentration across the site to
3 range from 3.95 milligrams per liter of nitrogen to 5.1
4 milligrams per liter of nitrogen.

5 This, as we understand, is a significant
6 improvement over the existing site conditions, which
7 have nitrogen concentrations much in excess of these
8 values. I also should mention that these values are
9 about 50 percent -- less than 50 percent, if you use the
10 3.95 value, of the nitrogen-nitrate standard for
11 drinking water supplies -- the maximum contaminant
12 levels.

13 BY MR. MURRAY:

14 Q And if you took out some of your more
15 conservative assumptions, it would reduce the nitrates
16 even further?

17 A It would reduce it.

18 Q Would you explain, briefly, the different
19 categories of chemicals and how they fit into an IPM and
20 a Best Management Plan?

21 A The owners have agreed and have proposed the



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1 development of Best Management practices and an IPM
2 program, and what is happening on golf courses nowadays
3 is a real switch from the soluble nitrogen formulations
4 to insoluble forms, meaning that they're slow release,
5 slow uptake, where they can take anywhere from a few
6 days to a week for the nitrogen to break down and become
7 available to the plants.

8 The soluble nitrogen fertilizers -- the normal
9 stuff that we use on all of our lawns -- is a rapid
10 uptake. It's available immediately for plants to
11 uptake.

12 So, an IPM program will factor in the use of
13 slow-release nitrogen to lower that loading -- that
14 concentration -- because more will be uptaken into the
15 plants and be available to the plants.

16 The other aspect of an IPM program relates to
17 pesticides. Obviously, with an IPM program, you're not
18 doing planned applications of pesticides. You do it on
19 a response-related basis once you see an outbreak and
20 once you can't control it any other way than the use of
21 pesticides.



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1 It's to minimize the use of pesticides
2 totally, if at all possible, and that only under extreme
3 conditions do you factor in the use of pesticides to
4 control either vegetation outbreaks, weed outbreaks,
5 fungicides, funguses, and insects.

6 Otherwise, the main features of an IPM program
7 are to use other forms of control prior to having to go
8 in and do a periodic application of a pesticide.

9 In addition, the pesticides, in some of the
10 recent literature, have been grouped into their
11 persistence and their mobility in the environment.

12 Again, an IPM program would only use those chemicals
13 that are not very persistent in the environment and are
14 not very mobile.

15 Now, golf course superintendents are becoming
16 wise. They're smarter. They know their liability, and
17 they know what they should do in terms of proper
18 management. The technology is out there now to properly
19 apply these chemicals and not cause an environmental
20 impact.

21 Now, our conclusion, after reviewing a number



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1 of golf course situations, setting up monitoring
2 programs to check the action that's taken by a
3 superintendent as he moves through an IPM program is
4 that we're just not seeing any significant
5 concentrations in the ground water or moving off the
6 site at these golf courses with an active IPM program
7 and then a monitoring program to back that up to assure
8 that it's working.

9 Q Is there a tension between the economics of
10 operating the golf course and the objectives of an IPM,
11 or are they complimentary?

12 A They're complimentary. The idea is that, you
13 know, if you use less chemicals, you have to purchase
14 less chemicals for the site. So it's to the advantage
15 of the operator of the golf course to reduce as much as
16 possible the costly pesticides and nutrients that he
17 would have to apply to that.

18 MR. MURRAY: That's all I have. Thank you.

19 CHAIRMAN CORKRAN: Mr. Murphy.

20 MR. MURPHY: May I just register an objection?

21 I'm not trying to be difficult, but we're here on what



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1 is called a "quasi-judicial proceeding," and only the
2 people who are part of this proceeding have the right to
3 participate, and this comes about because of an
4 application filed with Queen Annes County -- official
5 documents -- which contained an environmental
6 assessment.

7 CHAIRMAN CORKRAN: May I interrupt?

8 MR. MURPHY: Yes.

9 CHAIRMAN CORKRAN: Is this your summation now?

10 MR. MURPHY: No, I'm sorry. I'm just
11 registering an objection.

12 CHAIRMAN CORKRAN: Okay.

13 MR. MURPHY: The objection is this. This
14 witness is the second witness who has gone into totally
15 new matter that was not covered at all in the
16 environmental assessment. We have a totally new model
17 with totally new technology, for lack of a better term,
18 and this places a very difficult -- it places people who
19 were supposedly on notice by the filing with Queen Annes
20 County of what this was all about in a very difficult
21 position, including my clients.



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1 CHAIRMAN CORKRAN: May I interrupt a minute --

2 MR. MURPHY: Yes.

3 CHAIRMAN CORKRAN: -- because my memory, if it
4 serves me halfway correctly, is that you presented the
5 study of Cape Cod --

6 MR. MURPHY: That's right.

7 CHAIRMAN CORKRAN: -- I believe.

8 MR. MURPHY: That's right. I presented the
9 Cape Cod study. The Cape Cod study -- no, actually,
10 they presented it. They, I think, originally introduced
11 the Cape Cod study.

12 CHAIRMAN CORKRAN: Not to my memory.

13 MR. MURPHY: Perhaps I'm wrong. Perhaps it's
14 the Penn State study. But they did that, and then we
15 had the Cape Cod study and other testimony; now they're
16 coming back with a totally new model that I'm sure is --
17 you know, has very great scientific bases, but it's very
18 difficult to be in a position of attempting to
19 understand this at almost ten o'clock at night and have
20 any experts look at it and respond to it. I'm just
21 saying a practical difficulty.



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1 CHAIRMAN CORKRAN: Yes, I think that's what we
2 have to do, certainly, and we intend to do just that.
3 Now, I would proffer to you that do the same thing again
4 on this report that's a matter of record, and have
5 whoever you would like to have and put that in your
6 report.

7 MR. MURPHY: I'm not trying to sound
8 difficult, but when I come in with the report, it's
9 going to be less -- you're not going to hear a witness
10 about it. All you're going to do is read it.

11 As I understand the plan of this, there is no
12 rebuttal to the rebuttal. Is that right, Mr. Deming?

13 CHAIRMAN CORKRAN: That was my understanding.

14 MR. MURPHY: Is that right?

15 MR. DEMING: (Nods head affirmatively.)

16 MR. MURPHY: You see, now, we've gotten into a
17 totally new model, see, and I'm making that objection.
18 I'm not trying to be difficult.

19 MR. MURRAY: I would like to respond to that
20 objection --

21 CHAIRMAN CORKRAN: Surely.



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1 MR. MURRAY: -- which I think you've already
2 given more credence than it deserves.

3 We're here on rebuttal testimony. What we're
4 doing tonight is rebutting the testimony that my
5 witnesses heard, and I heard, and you heard --

6 CHAIRMAN CORKRAN: I understand.

7 MR. MURRAY: -- for the first time this
8 afternoon. So, if Mr. Murphy has a complaint, it's that
9 his experts aren't here to offer surrebuttal.

10 We waited around all day -- all day long. We
11 had no opportunity for any kind of preliminary input
12 about what was going to be given.

13 I think that you go quite a great way to
14 giving Mr. Murphy and his clients a great opportunity to
15 have another opportunity after this hearing to put in
16 some additional arguments.

17 I object to that, but it seems to me that it's
18 still in the interest of getting the process moving. So
19 let's understand, at least, that I think you've already
20 bent over backwards, and I do not want you to understand
21 that I'm agreeing in any way that Mr. Murphy's



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1 complaints are well-founded. I'm merely agreeing to get
2 the process along and over with.

3 CHAIRMAN CORKRAN: I think we understand that.

4 (Whereupon, there was a discussion off
5 the record.)

6 CROSS-EXAMINATION

7 BY MR. MURPHY:

8 Q Mr. Roy, you'll be available to my witness to
9 explain to him the details of this model and that sort
10 of thing?

11 A Absolutely.

12 Q Now, when you're trying to analyze the
13 nitrogen going down into the ground water, did you
14 consider these ponds and the water flowing into the
15 ponds?

16 A No, I didn't because I don't think that makes
17 a difference on this site. You're not talking about
18 nitrogen application to the ponds. You're not talking
19 about nitrogen application to the land surface, and
20 that's what we model: the application sources to the
21 active management areas, as well as taking into account



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1 impervious surfaces and nitrogen loading from the sewage
2 system.

3 So that's not a nitrogen source that would be
4 input into this model at all.

5 Q Won't the run-off carry the nitrogen into the
6 pond?

7 A Not at all. Under turf management, there is
8 no surface water run-off.

9 Q There won't be any run-off --

10 A That is what has been documented in numerous
11 articles on golf course management -- turf run-off, and
12 I think you'll see that in the Penn State study, as
13 well. Only under that extreme condition -- six inches
14 per hour, a 100-Year Flood event -- could they even
15 force the system to produce surface run-off.

16 Q So there won't be any surface run-off?

17 A Not at all.

18 Q I thought the idea of building the ponds was
19 to hold the surface run-off.

20 A That's not my understanding at all.

21 MR. MURRAY: For the record, again, in the



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1 interest of keeping the ball rolling, Mr. Rouse
2 testified and we will stipulate that one of the design
3 considerations regarding the ponds and the grading of
4 the surfaces is that in the event there is any surface
5 run-off -- and there may be if there is a hurricane --
6 it will go to the ponds, as opposed to tidewater, except
7 in the buffer areas where there won't be any grading
8 because we're supposed to leave the buffer areas alone.

9 BY MR. MURPHY:

10 Q Well, for example, the Best Management Study
11 says, "The first consideration was to divert as much
12 stormwater as possible away from tidal waters or
13 unmanaged areas. This is accomplished by directing
14 surface drainage to existing or to be constructed
15 nontidal ponds. The ponds are hydraulically
16 interconnected and used as reservoirs for irrigation.
17 This represents the ultimate in recycling and eliminates
18 the possibility of negative impacts of run-off to
19 sensitive areas."

20 You're saying there is not going to be any
21 run-off into these ponds?



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1 A Under an established turf system, no, there
2 will not be. Obviously, during construction, if there
3 is some heavy precipitation events, there will be
4 surface run-off and that's the function of those ponds,
5 also, is to contain that situation and surface run-off,
6 as well as, I understand, also, that there will be a
7 stormwater and erosion control plan implemented during
8 the construction of this golf course, and obtaining all
9 of those necessary permits will insure that any overland
10 flow or surface run-off will be minimized during
11 construction.

12 Q Now, why did your model say that there would
13 be less nitrates reaching the ground water?

14 A Again, it's a concentration issue. If we're
15 looking at the input over a large area at very managed
16 and timed intervals so that it's not a direct input to
17 the ground water, there is an uptake or you could call
18 it "sinks" from various sources, and that which makes
19 its way to the ground water eventually is this
20 combination of all of these different sources.

21 The lessening is a result of the fact that you



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1 have recharges on the site. As Mr. Brinsfield
2 estimated, that under a turf condition, you have more
3 infiltration than an under an agricultural situation.

4 We were even more conservative in our recharge
5 estimates than Mr. Brinsfield estimated somewhere to be
6 15 to 20 inches. We were using estimates much lower
7 than that.

8 Q Well, the thing I don't understand is, is
9 there going to be less nitrates applied -- less nitrogen
10 applied?

11 A Well, I think you've heard already that the
12 amount or the mass is approximately the same, but I
13 would also assert that under an IPM program, that could
14 be reduced significantly and the form of the nitrates
15 can also be reduced to use a slow-release nitrogen to
16 further reduce the loading to the ground water.

17 So, not even taking that into consideration,
18 what you have is the same quantity -- you can view it
19 this way -- the same quantity of nitrogen in pounds,
20 apply it to the surface, and you get a dilution effect
21 after the uptake from all of the turf grasses and the



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1 other forms of nitrogen sinks.

2 Q The element doesn't break down. I mean, the
3 nitrogen doesn't break down in dilution.

4 A It changes forms, but the total mass is the
5 same.

6 Q The total mass is the same.

7 A That's right.

8 Q So, isn't the same amount going into the
9 ground water?

10 A From a loading point of view, yes, the
11 poundage is the same, but we're talking about recharge
12 rates and ultimate concentrations in the ground water,
13 and that's a factor of basically dilution after you
14 subtract out the leachability or the amount that can
15 make its way past the uptake potential by the
16 vegetation.

17 Q I understand that. Do you say that the turf
18 uptakes more than the agricultural end?

19 A Yes.

20 Q So that is where the lower amount of -- there
21 will be less loading because it's turf, as opposed to



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1 agriculture?

2 A Yes, that's right. Plus, with agriculture,
3 you have particles that can move over the surface soil
4 and erosion control, and the nitrogen can move with
5 that, also, and then eventually make its way to the
6 ground water.

7 Q But just addressing leaching, what you're
8 saying is is that the plant uptake from turf will uptake
9 more of the nitrogen than the agriculture will?

10 A That's right.

11 Q And that's why you're going to have more
12 nitrogen going down?

13 A Well, no.

14 Q Then why you'll have less nitrogen?

15 A You'll have less nitrogen going down, not
16 more.

17 Q Right.

18 A Also, on top of that, you have more
19 infiltration or more dilution. As Mr. Brinsfield also
20 asserted earlier, that under a turf -- a managed turf
21 environment, there is more infiltration, more



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1 opportunity for dilution of the nitrogen.

2 Q I keep returning to this point. I'm not
3 trying to sound opaque, but I understood that you're
4 saying you're going to have less nitrogen going down
5 through the soil column, I guess you would call it, to
6 the ground water than with agriculture because the turf
7 takes up more of the nitrogen itself.

8 Is that why the ultimate loading to the ground
9 water is less? Is that the reason?

10 A No, it's two factors.

11 Q What is the other factor?

12 A The other factor is the infiltration capacity
13 of turf grass versus agricultural fields. Barren
14 agricultural fields or agricultural fields even with
15 crop infiltrate less to ground water than an active turf
16 area.

17 Q Well, "infiltration" means "passage," doesn't
18 it, passage of water?

19 A That's right. With agriculture, you'll get
20 some of that water going off the site in surface water
21 run-off.



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1 Q But you say your infiltration is higher with
2 turf, right?

3 A That's right.

4 Q So, won't the nitrogen carried down be
5 proportionately higher?

6 A No, we're talking about the same poundage
7 being applied over the area -- the same mass. All we're
8 doing is diluting it with more water. Plus, we're
9 providing an opportunity for more uptake because --

10 Q I understand you're going to have more uptake
11 because of the turf --

12 A Correct.

13 Q -- but where does the dilution and the more
14 water come from?

15 A More infiltration under turf management versus
16 agriculture.

17 Q So there would be more water coming down, but
18 forgetting the amount of uptake, isn't it the same
19 amount even though it's diluted? Isn't the loading the
20 same?

21 A The loading, in terms of the mass of nitrogen,



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1 is the same. What we're concerned with is, what is the
2 ultimate concentration in the ground water? What is the
3 ultimate concentration when this nitrogen -- that
4 portion that cannot be used by the plant -- makes its
5 way to the ground water?

6 That's a vital issue here because that's
7 another one of the issues that the Commission has stated
8 as its goal of the Chesapeake Bay Critical Areas
9 program: to reduce nutrient loading to the bay. We're
10 saying here we're reducing nutrient loading to the bay.

11 Q It seems to me what you're saying is, is that
12 because you're going to have more of it going down into
13 ground water -- infiltration is going to be higher --
14 it's going to be diluted more, right? There is more
15 water going down?

16 A There is more water going down, but not more
17 nitrogen.

18 Q What?

19 A But not more nitrogen.

20 Q Nitrogen is the same or less because of the
21 plant uptake, correct, but aside from it being less



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1 because of plant uptake, the volume of nitrogen going
2 down is the same?

3 A No.

4 Q Why not?

5 A Because you have more uptake in the
6 vegetation.

7 Q Well, I understand that, but putting that
8 uptake aside --

9 A You can't put that uptake aside. I'm sorry.
10 I just can't agree with that line of thinking.

11 Q No, I'm not trying to do that. I'm just
12 trying to get the point -- I'm trying to understand.

13 Are you claiming that aside from the uptake,
14 there is less nitrogen going down, or is it the same
15 loading, but it's diluted?

16 It seems to me it's the same loading, but it's
17 diluted into a larger body of water.

18 A No, you can't discount the uptake with turf
19 grasses versus vegetation, and you keep trying to get me
20 to say that.

21 Q No, no.



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1 A What I'm saying is that there is less nitrogen
2 moving to the ground water because of increased uptake,
3 plus you get more infiltration into turf grass than you
4 do under agricultural situations; there is more
5 dilution.

6 Q But dilution doesn't really affect the volume
7 of nitrogen, does it?

8 CHAIRMAN CORKRAN: Mr. Murphy, I think we've
9 heard this hashed and hashed and hashed.

10 MR. MURPHY: All right. I'm sorry.

11 CHAIRMAN CORKRAN: I would suggest to you that
12 if you don't understand it, call him up tomorrow. We
13 understand. I would suggest that this panel understands
14 it, and if you don't understand it, I feel sorry for
15 you, but let's proceed if you would, please.

16 MR. MURPHY: I'm sorry I tried your patience.

17 CHAIRMAN CORKRAN: Well, I suggest that you
18 maybe tried some other --

19 MR. MURPHY: I'm sorry. I'm serious. I
20 didn't realize I was going that far. I'm sorry.

21 BY MR. MURPHY:



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1 Q Does your model get into pesticides?

2 A Not at all.

3 Q You suggested with proper IPM, the pesticides
4 are really not a problem?

5 A That's right. That's the basis of our
6 experience, as well as the literature.

7 Q Did you get into the wildlife situation at
8 all?

9 A No.

10 Q Have you done any studies of the Queenstown
11 Creek situation?

12 A No, not at all.

13 Q Are you aware of it?

14 A In what manner?

15 Q I mean, of the existing water quality at all?

16 A No.

17 Q Now, one thing that occurred to me is, there
18 is nitrate contamination on the site through the
19 existing agricultural practices?

20 A That's right.

21 Q So, the soils, they are susceptible to this,



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1 are they not?

2 A Ask that question again.

3 Q Well, you say that the existing nitrogen-
4 nitrate concentration is high, in your view, because of
5 the agricultural practices?

6 A That's right.

7 Q Doesn't that indicate that the soils do not
8 have a good capacity for filtering those nitrates?

9 A I don't think that's a function of the soils.
10 It's a function of the vegetative covering. The soils
11 don't hold the nitrogen. It's the vegetation that
12 uptakes the nitrogen. The soil may impede ground water
13 flow so that there is more opportunity for nitrogen
14 uptake.

15 MR. MURPHY: That's all I have. Thank you.

16 CHAIRMAN CORKRAN: Thank you.

17 MR. MURRAY: Bob Rauch.

18 Whereupon,

19 ROBERT RAUCH,

20 a witness, called for examination by counsel for the

21 Protestants, having been previously sworn, was examined



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1 and testified as follows:

2 DIRECT EXAMINATION

3 BY MR. MURRAY:

4 Q Mr. Rauch, I just have a small number of
5 questions, which are basically in the nature of cleaning
6 up some loose ends.

7 But before we get to those quickies, you've
8 heard the testimony today regarding water quality by
9 both sides?

10 A I have.

11 Q In general, do you have anything to add to
12 what you've heard?

13 A No, I simply support the contention that our
14 proposed project will have a positive impact on water
15 quality.

16 Q Would it be your plan, as part of the IPM, to
17 have it reviewed for specifics by the EPA?

18 A Yes, in conversations with representatives of
19 EPA's IPM program -- specifically, Ann Lesley -- I
20 requested or suggested that they take an active role in
21 the preparation of the IPM plan. She has indicated that



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1 they would very willingly review the plan and provide
2 their comments, in fact, the result being an endorsed
3 plan.

4 Q You've heard some discussion, I think, about
5 -- and I believe it was from Mr. Gerber -- regarding
6 crop rotation and what he termed the "monoculture" in a
7 golf course environment. Do you have any comments about
8 that?

9 A Yes. In my research discussions with various
10 experts -- and as I've testified previously, I don't
11 present myself as the expert, but simply to conduct and
12 collect the information -- it's my conclusion there is
13 clearly a void in the knowledge of turf and turf
14 management from agricultural experts.

15 One area that appears to be a common area of
16 confusion is this concept of monoculture. The
17 information provided to me is that turf management is,
18 in fact, a very active crop rotation program in that
19 they consistently evaluate and analyze their grasses
20 relative to pest resistance.

21 There is a continuous program of overseeding



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1 and changing of the crop. This, in fact, is even a more
2 efficient crop rotation concept than in the agriculture
3 in that doesn't involve showing and exposing of the
4 soils for the erosions, and, in fact, the crops that are
5 continuously rotated into the turf are, in fact, more
6 and more pest resistant, which reduces the necessities
7 for continued use of various pesticides.

8 Q There has been some discussion today about
9 grading and disturbance. Comment, briefly, if you
10 would, on the amount of grading and dirt-moving needed
11 to be done on this golf course in the so-called
12 "disturbed area."

13 A The information was taken from our plats --
14 the statistical information that was included in the
15 tables. One of them was -- areas of disturbance;
16 specifically, Queen Annes County, in their presentation,
17 requires us to identify the areas that are devoted to
18 the golf course and refer to them as "disturbance."

19 The 220 or 225 acres that I think was referred
20 to and is also referenced in our charts is actually a
21 boundary that was drawn around the entire golf course



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1 perimeter, and that's a necessary number for the Queen
2 Annes County computations.

3 The actual graded areas are more close to
4 about 125 acres of actual graded areas.

5 Q What about the dirt moving?

6 A The movement of the dirt, there has been some
7 testimony relative to intensity or amount of
8 disturbance. We specifically were conscious of these
9 concerns and have worked with the golf course architect
10 on a way to actually minimize earth moving relative to
11 golf courses.

12 I believe the testimony was there was an
13 estimate of 200,000 cubic yards of material when, in
14 fact, your average golf course may range 800,000 yards
15 without much trouble. I'm working on a project now that
16 actually has a million and a half yards of earth moving.

17 So, the estimates of 200,000 cubic yards of
18 earth moving are minimal for a golf course project, and
19 that's no accident. That was specifically one of the
20 directions given to the golf course architect.

21 Q Just a very few minutes ago, Mr. Murphy asked



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1 a question about the use of the ponds as a means of
2 collecting surface water run-off, and I believe he was
3 expressing some confusion about why there was that
4 design feature built in when the expectation was, except
5 in an extraordinary storm event, there really wouldn't
6 be much surface run-off from the turf.

7 That's your design. Why was it done that way?

8 A Again, consistently, our approach is to be as
9 conservative as possible. Within the county stormwater
10 management regulations within the critical zone, there
11 was some interest expressed by the county to actually
12 manage the 100-Year Storm.

13 Our stormwater basins or ponds were designed
14 to have adequate storage to actually store the 100-Year
15 Storm. There was also earlier testimony referencing
16 overflows. Those are not provided in this plan. It's
17 not our intention to discharge water from these ponds
18 because we have provided adequate storage for up to the
19 100-Year Storm.

20 So, under certain circumstances, we do
21 anticipate run-off, and those are extreme events.



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1 Q Are there not areas of the project that are
2 not going to be in turf?

3 A There are minor areas of imperviousness, and
4 those areas would run off to the ponds. That is one
5 point that I had forgotten to mention or make note of,
6 but I did want to comment on it.

7 There was reference to the amount of
8 pollutants relative to the imperviousness, and
9 computations were suggested that they used over four
10 acres of impervious areas for calculating the pollutant
11 loads, the heavy metals.

12 Well, our impervious do, in fact, include a
13 parking lot, but they also include golf cart paths,
14 which do not have the traffic on them. They also
15 include rooftops.

16 We're, in fact, taking equivalent impervious
17 areas out of the critical zone and moving them into the
18 noncritical zone, and not increasing those areas.

19 So I think the testimony relative to the
20 potential impacts of our little parking lot were quite
21 overstated.



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1 MR. MURRAY: That's all I have. Thank you.

2 CHAIRMAN CORKRAN: Thank you. Mr. Murphy.

3 CROSS-EXAMINATION

4 BY MR. MURPHY:

5 Q I guess I'm still a little confused about the
6 stormwater run-off. You say on the stormwater
7 management study, that you're lowering the run-off to
8 tidal waters by approximately 50 percent.

9 A That's correct.

10 Q That's from predevelopment?

11 A To postdevelopment.

12 Q That run-off to tidal waters, is that the 100-
13 Year Storm?

14 A No, what you have to understand about the
15 county's requirements for stormwater management -- and,
16 again, this is consistent with our attempt to be
17 conservative in all regards -- under the run-off
18 analysis required under the Stormwater Management
19 Ordinance, your predevelopment conditions are required
20 -- you're required to use empirical numbers to relate
21 what your run-off relationships will be -- run-off curve



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1 numbers -- and, in fact, your postdevelopment
2 conditions.

3 There are no specific run-off curve numbers
4 allocated for golf courses. We have, in fact, had to
5 use pasture numbers, which are extremely conservative
6 and do generate, in fact, run-off, which is not
7 consistent with the report we presented from Penn State
8 and the other information that's been presented here
9 indicate that there won't be run-off.

10 We specifically asked the county if we could
11 modify our curve numbers to reflect data that was
12 accurate and supported by the studies. They indicated
13 that until that information was reflected in the SCS
14 documents, that they preferred us to use their curve
15 numbers.

16 So, while using their curve numbers we do
17 produce a run-off, even using their curve numbers there
18 is a 50 percent reduction, and that's in the 210 -- I
19 don't have that report in front of me, but we also
20 evaluated the 100 for storage.

21 Q Well, Mr. Roy said that, basically, you were



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1 managing all of the stormwater by infiltration. Is that
2 your understanding of it?

3 A We believe that the actual case will be that
4 we won't be getting any surface run-off.

5 Q The stormwater will be handled by
6 infiltration?

7 A And plant uptake.

8 Q And plant uptake. Your report -- the pages
9 aren't numbered, but it's the next-to-the-last page. It
10 says, "Included in this report is, however, computations
11 to verify that the first inch of run-off will be
12 handled" -- excuse me -- "will be retained in existing
13 and proposed ponds. The Queen Annes County Stormwater
14 Management Ordinance references managing the first inch
15 by infiltration. Due to soil types existing on the site
16 and the proposed use, the management of the first inch
17 is handled more efficiently through retention in the new
18 ponds located in the tidal watershed."

19 Isn't this saying that you're not going to
20 handle it by infiltration, but it's going to go into the
21 ponds? Is that what you're saying?



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1 A No, I think maybe I didn't make myself clear,
2 and you didn't understand this.

3 Q Perhaps.

4 A But we have varying agencies that review and
5 mandate certain documents. The Queen Annes County
6 Stormwater Management Ordinance does not reflect the
7 data that has been supported through all of the studies.

8 It is our responsibility in making a
9 presentation to Queen Annes County that we comply with
10 their codes and requirements. So, in fact, I'm left
11 with no alternative but to conclude, as I have, even
12 with the conclusions which are far conservative, we
13 don't create a problem.

14 So I don't know where that discrepancy leads
15 you to a problem, other than to further reinforce that
16 we have consistently been conservative in all of our
17 assumptions.

18 Q What, basically, you're saying is, is that you
19 don't believe there will be any run-off into these ponds
20 except in very unusual 100-Year Storms?

21 A That's right.



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MR. MURPHY: That's all I have.

CHAIRMAN CORKRAN: Thank you, Mr. Murphy.

Thank you, Mr. Rauch. That's it.

(Whereupon, at 10:30 p.m., the above-entitled hearing was adjourned.)



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I, DEBORAH TURNER, the officer before whom the foregoing testimony was taken, do hereby certify that the witness whose testimony appears in the foregoing transcript was duly sworn by me; that the testimony of said witness was taken by me by magnetic tape and thereafter reduced to typewriting by me or under my direction; that said testimony is a true record of the testimony given by said witness; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this testimony was taken; and, further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of the action.

Deborah J. Turner
DEBORAH TURNER
Notary Public in and for the
State of Maryland

My Commission expires:

July 1, '90



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