

2009-06-23 10.04 NPDES Stormwater and Low Impact Development

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[00:00:00] START AUDIO

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OPERATOR

The broadcast is now starting. All attendees are in listen-only mode.

LARRY WOODS

Hello and welcome to the EPA NPDES Stormwater and Low Impact Development webinar. My name is Larry Woods. I'm with the U.S. EPA Region 9 in San Francisco. I'd like to welcome everyone for signing in. We have a pretty good agenda. We have Dave Kling with the Federal Facilities Enforcement Office in Washington...

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who's gonna do some opening remarks. We have Michael Mitchell from EPA Region 4 whose gonna do an overview of the stormwater laws and regulations. We have Lee Hanley, an inspector from EPA Region 8, and Michael Prescott, a contract inspector, who's gonna talk about federal facilities, inspections, and stormwater observations. We have Robert Goo from EPA headquarters who's gonna talk about the Energy Independence and Security Act...

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and Low Impact Development. And then a brief summary at the end. And I'd like to welcome everybody again for logging in. And now, I'll hand it over to the contractor, Tommie Jean.

TOMMIE JEAN VALMASSY

Thanks, Larry. Welcome everyone. We are so glad to have you here today. I just wanna go over some of the logistics. Your lines are muted so you won't be able to speak. This is a recorded session, and we are also preparing a written transcript of this event. We do encourage your questions about the content. And the way you can...

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ask the question is to just go to the little question tab on your control panel and type in your question there. If you're having technical difficulty, go ahead and type in your technical question there, but you can also type in questions for our presenters. And the way we have it set up is after each speaker, we have just five minutes set aside for question and answer. I'll be reading the questions aloud and then the presenter can answer them right then. If we run out of time and aren't able to answer your question

or if it's something we need to get back to you on, we will...

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get back to you later after the event. So if we're running out of time and you still have questions, please go ahead and type those in. There is something called a "Raise your hand" feature on this GoToWebinar, and it's very difficult for us to respond to those. So please don't use the "Raise your hand." If you have a question, just go ahead and type it in there. I also wanna let you know that at the end of this event, you'll have a pop-up window with a survey. It has about seven questions, multiple choice or short answer, and it just gives us some feedback on how useful this event...

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was and helps us to make it better if we do another one of these. So we'd really appreciate you taking just the two or three minutes to fill out that survey at the end. So with that, I'm gonna move right into our presentations. In your reminder e-mail about this, there was a link for how to go to download these presentations, and I'll send that out again, too, so that you can download these presentations to follow along or after the event. Most of the presentations are already posted. We couldn't quite get all of them, so within the...

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week after the webinar, we'll make sure all of them are posted on the FedCenter Website, and you can download those. So with that, Dave Kling, I'm gonna go ahead and hand it over to you to get us started today.

DAVE KLING

Thanks, Tommie Jean, and thanks to Larry as well. Stormwater runoff from federal facilities can have a significant impact on water quality as many of you know. Such discharges are responsible for beach closings, swimming and fishing advisories, habitat degradation and worse. The EPA...

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Federal Facilities Enforcement Office has developed and is now implementing a federal facility component of the agency's national stormwater strategy. Now, this action is in response to EPA's strategic plan goals of improving wet weather and stormwater controls, and reducing nonpoint source pollution. It's also in response to evidence of noncompliance with stormwater requirements at federal facilities, and in response to EPA designating stormwater as a national enforcement priority.

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Now, the emphasis on federal facility construction stormwater activity is a natural extension of EPA's National Stormwater Strategy. And to that end, the Federal Facilities Enforcement Office, my office, has aligned the agency's compliance monitoring enforcement resources across the nation to improve federal facility stormwater compliance. The strategy includes increased stormwater inspection to federal facilities, and when appropriate, enforcement action against both federal agencies and contractors.

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Now, federal organizations which are often responsible for implementing the country's laws are usually held to a higher public standard in complying with those same laws. So we need you to set a good example. Please take full advantage of this compliance assistance opportunity to learn more about your stormwater obligations to improve your facility's compliance and to avoid common stormwater violations. It had been observed at federal facilities nationwide. So welcome again to the webinar and I look forward...

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to meeting many of you face to face in the future.

TOMMIE JEAN VALMASSY

Great. Thanks, Dave. Our first speaker up today is Michael Mitchell. And, Michael, I'm gonna pull up your presentation here.

MICHAEL MITCHELL

Thanks. Thanks so much.

TOMMIE JEAN VALMASSY

Okay, Michael, the floor is yours.

MICHAEL MITCHELL

Good afternoon and good morning. I'm Mike Mitchell. I'm with the U.S. EPA Region 4 in the Water Protection Division. Today, I wanted to talk to you about some of the requirements...

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as it relates to construction activities at federal facilities. Federal facilities are a different animal. When you look at typically the construction sites that occur are usually permanent across the board. I wanted to talk about some of the nuances as it is associated with the Construction General Permit. So if we can begin the topic for today's webcast, I'm gonna talk a little bit offhand the history of the Stormwater Construction Program, some

of the recent updates and...

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get into the actual nuts and bolts of the program, whose covered particularly, and who's responsible at a site as it relates to federal facilities. I'm gonna talk about the meat and potatoes of the Stormwater Pollution Prevention Plan, which is the centerpiece of the Construction General Permit, some of the site considerations, plan development, and other considerations that relate to BMPs and other things at that facility, and also tips for federal facilities. Again, we're dealing with something that...

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is a different animal, so to speak. When we talk about construction sites, typical construction sites, there's a lot going on at federal facilities, and so I really wanted to talk upon--you know, touch base on that a little bit. Historically, the program, as it relates to the NPDES Stormwater, it started around 1990 with the onset of Phase 1 regulations. And as such, large construction sites were actually considered part of the 11 categories of construction activities under the...

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402(p) of the federal Clean Water Act. And so when you deal with category 10, which is the construction activities, it was dealing with large sites--those 5 acres or greater--that were part of a common plan of development. Also, with the onset of Phase 2 regulations, which came out--now with the second set that came out right around 2000, in the interim between Phase 1 and Phase 2, EPA was sued due to the...

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arbitrary selection of 5-acre or greater sites. And so with that, you saw with Phase 2 the lowering of that threshold to 1 acre or more. So ideally, what you have are sites greater than 1 acre being covered under a CGP or Construction General Permit. And when you talk about 402(p)(6), that was the actual reg site that covers the small construction sites.

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Basically, when we talk about the Construction General Permit update within the past year, EPA has updated its Construction General Permit or its CGP, and it's basically identical to the 2003 Construction General Permit that EPA issued. With regards to that, EPA does plan to develop a revised Construction General Permit for reissuance right around 2010. So the current 2008 is only gonna be...

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effective for about two years. Concurrently going on with this

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activity of the Construction General Permit, we have the Effluent Guidelines for construction sites that is currently under finalization. We should have finalization by the end of this year. And with that, the Effluent Guidelines would be a component of the erosion and sedimentation control aspect of the Construction GP once it's revised.

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As it relates to construction activities, you're looking at primarily several parameters that are gonna be addressed, primarily sites greater than 30 acres, dealing with Effluent Guidelines as it relates to sediment basins. And then there's a NTU standard that may be employed in there. Now, I would say stay tuned with regards to how this pans out because there's also the component...

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of post-construction that really wasn't added to that, but we can probably talk about that a little later. When you talk about Construction General Permits, basically the EPA General Permit is the national permit that's used as a baseline or template that other states may follow. And when I say baseline, it prevents the minimal levels of control that can be used at a site. Particularly, for other states, states can use the EPA General Permit...

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they will probably modify it to make it more stringent based on localized water quality concerns and whatever drivers you may have to make that permit--the additional measures in there more stringent. EPA, roughly, when you talk about delegated states or authorized states, there are roughly about 45 in the United States, and EPA--where you don't have delegation, EPA is the permitting authority, so that the EPA National Permit would be used in those particular...

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states. And like I said, it's an umbrella permit, and that it provides the baseline template. And that because it's a general permit, you'll find that the notice of intent is the application under which one would apply for coverage in that. So when you deal with other states outside of EPA, whether the state is a delegated authority, please make sure that you look at those requirements carefully because they may be a little different in terms of what they require as opposed to what EPA requires in its general permit.

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Right now, we should be on slide 6. When is a stormwater permit required for construction? Again, for large construction sites, it's land in terms of 5 acres or more. Depending on the state that you're in, some states may have just one blanket general permit

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for construction activities, so later we'd specify 1 acre or greater. Some states do have more than one general permit where it applies...

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1 for small activities, 1 to 5 acres and 1 for large activities. So again, the nuances differ from state to state, so you may wanna make sure that you're aware of what the state requirements are with regards to what permits you'll apply under. Again, let me talk about construction activities. It can also be less than 1 acre. And in cases where you have activities that are part of a larger common plan of development, for example, if you're building...

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in housing areas, they may give you those sites down to less than 1 acre, a quarter-acre site. It would still be a required activity to get coverage on their permit. And also, when it's less than 1 acre, we can find sites that can get coverage that are designated to be used by the state or EPA based on water quality impacts. So for example, if you have a potential to discharge or receiving water body, where a TMDL is concerned or you may...

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have localized drivers, they may present certain issues dealing with water quality concerns, the permitting authority may actually have the authority or require sites less than 1 acre to be permitted. And in those cases, they wanna make sure that sediment issues aren't a concern. Particularly, these drivers would be where sediment is a problem or sediment-related discharges. Again, we're talking about federal facilities. And under the...

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federal definition of federal facility, it's defined as any building, installation, land, owned or leased by the federal government. And again, we can talk anywhere from federal-owned golf courses, military bases, your local post office. So, again, there's a wide range of facilities, or wide range of activities, or requirements that may actually come under the nuances during the construction phase of these sites for CGP. Or note, just to keep in...

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mind that, with that onset of the definition of federal facilities under the Phase 2 MS4 Regulation, states also have the authority to designate those federal facilities as a small MS4 which primarily is looking at it as a small city or a small town based on the populations and the various activities that go there. But I really didn't wanna cover that today for that's a whole different genre. But just to keep...

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bear that in mind, so the large sites that--for example, military bases, we have large populations of act--people and also large--different--in the type of industrial activities. You may actually have coverage for the construction activities that go on at those particular sites, but also an MS4 permit, but that's up to the state or the EPA authority to delegate or designate that particular site.

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Who needs coverage? Basically, under the general permit, the operators would apply for the coverage under that, and so the operator can be defined as one of two things. It's the entity that has the operational control of the construction plans and specs. This could be that the owner or the developer of a project or it can be that entity that has day-to-day operational control of activities at a particular project. And so you're looking at...

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primarily a general contract. In most cases, you're looking at the general contractor. In most cases, when you look at the daily operations here. Who signs the notice of intent form? We're on slide 9. EPA requires that the company officer or a high-ranking official sign that notice of intent form. Ideally, with federal agencies, we're looking at a certifying official...

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and that is the high-ranking officer or the elected ranking official. It can also be a principal executive officer, and this includes a chief executive officer of the agency or a senior executive officer who has that responsibility. Oftentimes, you'll find that that principal executive officer will actually designate it down to a senior executive officer or someone else. Particularly if you have regional sites, you'll find that...

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at each of those sites will be an officer designated with that authority. Slide 10. Oftentimes at a particular construction site, you'll have a bunch of different actors who will operate at that site. And the question often becomes in the event of a violation, who's responsible for overall permit compliance? In this case, I would tell you that all parties are responsible for permit compliance. And you wanna make sure during the inspection...

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internal inspections at those particular activities that are occurring at your facility, that all the operators are under consideration for compliance evaluation. When you develop your pollution prevention plan, which we'll talk about more in a little bit, it has to clearly indicate all the parties that are involved or acting on that

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site and how their responsibilities are divided. Slide 11.

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This is the--the first slide, we're gonna talk about on the pollution prevention plan. When you deal with the Construction General Permit, there are various things that you do. You submit the Notice of Intent, but with that you also wanna develop your comprehensive plan, and this is your action plan or construction erosion control plan. It basically tells you and indicates how this project is gonna plan out. It identifies potential sources of stormwater pollution.

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So we're looking at where sediment is gonna be disposed or potential for sediment be disposed to water [INDISCERNIBLE]. The key thing here is we're minimizing any potential runoff and with that sediment coming offsite. But we also wanna make sure that we're protective of all the waters of the state or waters of the U.S. In this case, your localized streams and your tributaries, also lakes, rivers, and your coastal areas. You're gonna basically...

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describe what practices you're gonna do and perform to reduce pollutants, and also you wanna minimize the stormwater discharges. So you're looking at things like water quality and water quantity standpoint of controlling that and making sure sediment erosion is maintained on site. You wanna make sure that you're identifying procedures that you're gonna implement in terms of complying with this permit. You're describing at the site the major phases of each planned...

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activity, so that your pollution prevention plan actively is a living document, explaining what changes are gonna be made at that site and when from start to finish, and also who the major players are, where your potential areas of pollution are and so forth. So that any documented change and modifications, you're gonna make sure that that's updated and reflected in the plan. All right. Next slide is...

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breaking down what a Stormwater Pollution Prevention Plan is. There are six basic parameters as I see it, and we're gonna talk about each of these. The next slide is 13. We're gonna start with the site description, and we should be on slide 13 now. And what we're gonna talk about with the site description are the basic nuances and the particulars of that particular site. And what you wanna put in that pollution prevention plan to describe that.

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So if you go to the next slide, it's showing the Site Description/Site Map. You wanna make sure that you transverse the site prior to the actual start of activity so you'll know exactly the contours of the land, what natural features or water bodies or potential force of the pollutions you may have. You wanna make sure all of that is accurately described in the map prior to that. And you wanna prepare this site map to show the actual...

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contours and where the basic potentials for problems are also. Begin thinking about what types of controls you're gonna use. If you're gonna use--where to place a particular sediment basin, if you have various critical slopes on that side, what kind of controls you're gonna put in place. What I'm actually gonna say is this, so you wanna make sure that you minimize--in each portion of your construction activity, you're gonna minimize the potential for erosion and...

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sedimentation. So you wanna make sure that you have phased construction stabilization. We even--more than likely, temporary stabilization there. The next--slide 15 is dealing with the site description. The nature of the activity of the site, what the ultimate goal is on that site, what types of facilities are gonna be there, what permanent structures. You're gonna sequence those events from start to finish, so that you're gonna go from your clearing and grading and evaluation of those sites...

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to your actual placement of control measures. And along that, if you're gonna place roads first or whatever the case is, you're gonna make sure the sequence of those events are clearly spelled out in your pollution prevention plan, and that you're actually gonna show by sequencing that and minimizing the potential for problems. Give the estimated area of the site, your total disturbed area, which is the area that you're gonna actually clear and grade. Your runoff coefficient, which gives you some indication of...

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the erosivity of the soils and the potential for problems at that site. You're also looking at the existing soil and water data. Are there impaired water bodies or what additional control measures you may have to employ at that site to make sure that you're not contributing to that existing problem. The existing soils, oftentimes, you'll find whether or not these soils are well drained or poorly drained. It also gives you some indication of what changes...

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or control measures you're gonna put on site as this site changes. Oftentimes, you may have to bring additional soil in so they try to change the soil properties or the types of control measures that may be employed at that site also. Next slide. Now, we're gonna go into the second phase which is the description of the controls. Next slide. What you wanna do during the construction--the act of construction phase...

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is make sure that you're employing your proper sedimentation and erosion controls. That you're making sure that erosion is kept at that site and that sediment bed is not released. So you're gonna establish your control measures, you're also gonna establish your maintenance and procedures following the control measures inspections and so forth. You also wanna make sure that you're looking at not the potential for non-stormwater discharge to be released. And all these things are maybe...

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or where you have your fueling operations or you're storing chemicals, you wanna make sure that the potential for these discharge on all sites are maintained. And you also wanna look at other activities that may go on, that you're gonna make sure that's gonna be controlled during the course of the actual construction. Post-construction measures, this--we talked about the Construction General Permit. Ideally, what you're looking at are those--particularly stormwater control measures that are long term. So...

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that the first part is the establishment of temporary control measures to make sure that sediment erosion is maintained on site. You're minimizing the erosion and keeping sediment on site. The second thing would be those proprietary or permanent structures, maybe detention ponds. If you're employing any type of green structure or low-impact development, you wanna make sure that those sites are--the location of those sites are critical because there may be some infiltration involved. So that you wanna make sure you're not...

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compacting or changing the characteristics of those areas where you're gonna put these particular control measures at. Also, if you're gonna maintain natural areas and buffers, you wanna make sure that those are maintained during both the active and post-construction phases of those sites. Again, when you're--excuse me, I'm on slide 18 now--selecting stormwater controls. And

before you start actually selecting your controls...

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when you're looking at accessing the site and making your decisions on what work control measures are gonna be used, again, know what your applicable state and local requirements are. Again, there are some differences in the Construction General Permit requirements as you go from state to state. And states also, as well as, local entities also have their own sediment and erosion control laws that you may--that may be applicable at this site. You wanna also make sure that your stormwater management...

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controls are those that are basically in the state-approved BMP Manuals or that it's a recognized BMP that will work in that particular location or geographical locale or wherever you're employing these control measures. Also, you wanna make sure sanitary waste disposal is properly done there, too. You wanna make sure all of these things are under consideration and you incorporate those properly into your stormwater management plan.

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Key Elements to Consider During Construction, I'm on Slide 19. You're gonna plan again for minimal land disturbance. Again, if you can employ phased construction, a lot of times you go out at a site, you wanna grade the entire area. If you're gonna do that, you wanna make sure that you put some sort of temporary stabilization or ground cover on those other areas where you're not actively performing construction.

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You also wanna consider your site conditions. Again, tributaries that would cross through that construction site, you wanna make sure that they're protected. You wanna prevent any run-ons, so if you have critical slopes, you may wanna make sure that any closed point is diverted around that critical sloping area. You wanna slow down the runoff because that minimizes any potential for sediment leaving that site. Again, stabilize the soil as soon as you put your control measures in and...

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you wanna make sure that your sediment is trapped. If your erosion controls failed, more than likely, you're gonna have issues with sediment leaving that site. Also, make sure that you explore the areas downstream of that particular construction site to make sure prior to and during the active phases of construction that you're not clogging any water quality concerns. Again, a lot of times when you explore your...

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controls on site, they may look like they're in compliance, but if you look downstream, you'll see evidence of sediment in the stream. So you wanna make sure that you have the adequate controls in place and that those controls are being properly maintained and inspected. Slide 20, Selecting Sedimentation and Erosion Controls. We have two lines of defense. Primarily, we're looking at one, erosion control which is your primary protection. You're...

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minimizing your disturbed area and you wanna protect those natural features. So if you wanna maximize green spaces of trees that are already on site, you wanna protect those. Again, you wanna make sure that you have your proper buffers in place to protect any flows going to the stream. You wanna phased construction to limit the exposure period of the bare soils. You wanna control stormwater flowing onto the project and through the project so you wanna make sure that the proper diversions are necessary to...

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minimize any type of erosion issues. And again, you wanna protect your slopes to prevent gulying. You wanna make sure that the soils are stabilized with proper seed and mulch. Once going and real erosion occurs, it comes very expensive to put in controls to make sure that doesn't continue happening. Again, the second line of defense is your sediment controls. Any storm drain inlets, you wanna make sure those are...

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properly protected and actively inspected during the act of construction phases to ensure that there is no sediment going into the streams. You wanna make sure your perimeter controls are established with primary and secondary slope fences and any additional measures also knowing where to locate your sediment basins so that they don't create problems also. You wanna retain sediment on site. And if you have dewatering practices, you wanna make sure that those are maintained and controlled.

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And also with dewatering, there may be additional permits that you may have to get. So that, again, is another situation where you may wanna check with the state with construction activities, any additional permits or responsibilities that are part of the practice to make sure those are employed. And, again, you wanna make sure you have routine inspections. Slide 21. We also, again, as I said earlier, identify non-stormwater discharges...

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and identify those control measures that you're gonna use to protect those areas. One BMP for non-stormwater dewatering operations, there's an illustration here, you wanna use it where groundwater or accumulated precipitation will be discharged from same. You wanna make sure that your dewatering addresses sediment only because if there are any contaminants, oil, gas, that are--any other chemicals that may be in contact with that...

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you're gonna have to treat that as a potential hazardous waste, and that creates a whole another set of issues that you'll have to comply with, with regards to additional permits. Next slide. You wanna look at also--in maybe some other areas where a federal facility may be installed. There may be some problems with illicit connections or illegal discharges. And...

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this refers to dumpings caused by other parties, in this case, other than the contractor. So you wanna make sure that this site is properly inspected prior to the start of the activity, so that any of these potential issues are addressed early on. And, again, you wanna proceed with caution because if it's illegal dumping, there may be chemicals involved that are maybe hazardous, and it creates a whole other set of issues. So again, proceed with caution on that.

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TOMMIE JEAN VALMASSY

And, Mike, I just wanna let you know we'll be taking questions in about five minutes, so everyone can keep typing in their questions.

MICHAEL MITCHELL

Okay. Non-stormwater vehicle and equipment fueling. Make sure that your large trucks and vehicles are fueled on site. You wanna minimize any disturbances of fuel going off site. And so if you have...

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a fueling area, make sure it's in a proper location that you have secondary containment in the event of any spills from the fueling operation. You wanna make sure those areas are protected if necessary or if possible at all times. Along with the secondary containment, you can also try to make sure that the site is covered, so that there is a covered area to prevent any stormwater coming in to contact with that particular area. Other control measures you wanna make sure is offsite vehicle...

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tracking, that they're maintaining a--where these trucks are going and that they're--if you're taking fuel off site, that it's going to where it's designated. You wanna make sure of material management. Any chemicals or additional concerns at that site are being maintained properly and disposed of properly. Construction waste, you wanna make sure that there's a designated area where construction waste could be taken. If there are dumpsters in that particular area, you wanna make sure that those sites are also maintained. And again...

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sanitary waste is another issue that you wanna make sure is taken care of properly. The stabilized construction entrance and exit, you wanna make sure that you limit the number of entrances and exits. Make sure these trucks are using these areas for ingress and egress on to a site, and you wanna make sure that they're designed so that they can maintain or be used by the heaviest equipment at your site.

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Slide 27. You wanna make sure waste management, particularly, with delivery and storage. So if you have a spill containment volume for these particular waste management areas, they should be at least 1.5 times the volume of all containers, and the site should be properly compacted, so that it's impervious for any liquid materials for at least 72 hours. And you wanna provide cover during non-working days and...

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prior to all rainfall events. This particular slide here are some dos and don'ts. Again, you wanna make sure that the chemicals don't come in contact with soil. You wanna make sure that they're--secondary containment whenever necessary and that those sites are covered. Waste management, you wanna locate your sanitary facilities away from storm drains and watercourses. And again, you should make sure that you're properly inspecting that at least weekly.

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Next slide, 29. Managing stormwater after construction. Again, the whole concept when we're talking about the picture that you're looking on--later on during the--in the course of this webcast with the whole idea of low impact development. You wanna lessen the impact of development here at the site, so that you're dealing with pre-imposed runoff conditions so to speak. You wanna remove pollutants or the potential for pollutants, and you wanna slow down the runoff...

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so that it mimics pre-construction conditions. Next slide. Managing stormwater runoffs, dealing with post-construction consideration. You wanna employ tree and canopy programs after the site is finalized. For example, you may wanna retrofit and add additional trees to the site. Also, again, as we said earlier, you wanna make sure that you're...

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maintaining any green space or tree area so that trees add a particular benefit to the site in terms of reducing runoff volume. You also wanna employ--consider the use of biofiltration, bioretention. Again, this is using infiltration for impervious areas. For your parking areas, you may wanna consider some areas where you have porous pavements, and for some of these sites, green roofs.

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So summarizing controls during construction, you have your sedimentation and erosion controls, your temporary measures to make sure that the sediment is kept on site. You're also making considerations to control non-stormwater related discharges as it deals with waste management, construction materials, and other things. And then in the event of critical water bodies or potential to discharge critical water bodies, you wanna employ additional...

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control measures. Now, the Construction General Permit doesn't talk a lot about post-construction. But if that's employed, you wanna make sure that there is consideration and identification of those post-construction control measures indicated in the Stormwater Pollution Prevention Plan. Certification and notification, slide 32. You wanna make sure that your plan is written, signed by a certifying official, and make sure...

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you keep those plans on site in the event of an inspection by either the state or EPA or the local authorities. Next slide. You wanna look at the act of construction and implementation of the pollution prevention plan. You wanna schedule activities, make sure your controls are installed according to spec. Again, minimize exposure to soil so you can clear and grade as it's needed, and you wanna plan your construction activities...

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along the phased control installation measures. Thirty-six. Inspection and maintenance. Slide 37, please. You wanna conduct all inspections at the site, either by yourself or qualified personnel. Now, depending on the CGP by state, it may ask for

[00:37:35] qualified personnel or certified personnel. You wanna make sure that that's made clear when you actually perform your routine...

[00:38:05] inspections based on your SWPPP. You wanna set a schedule for inspections, particularly around rainfall events and also just a routine to make sure your sediment basins are clear. Maintenance and repairs. Make sure that you're looking at your control measures and that any necessary repairs are made promptly. Be thorough in your record-keeping. Make sure that any observations are recorded in your record, your inspections...

[00:38:35] and your maintenance. And with training, you wanna make sure that your people on site are aware that there is a permit, there are consequences for violating this permit, and that they're well aware of the proper procedures for maintaining sedimentation and erosion control and that they're up to par with routine maintenance and inspections. Final stabilization and termination are on slide 38. When you finish the--complete the job, you're gonna do the...

[00:39:05] final stabilization, and you're gonna do this site cleanup, which is removing any debris and making sure that the site is shored up properly, and that the controls, the permit measures are in place properly. And once you complete that, under the Construction General Permit, you would submit a notice of termination. So, again, when you talk about the pollution prevention plan, you're looking at site description, the general observations on site, developing the site map to make it consistent...

[00:39:35] with what you see out there. You're gonna employ your description of control measures. You're gonna employ also your inspection and maintenance, any certification statement by your general contractor or whoever is in charge of the site's day-to-day operations. And those are your primary pieces of that Stormwater Pollution Prevention Plan. For federal facilities, you wanna make sure that any contractor is performing work at that particular site or...

[00:39:35] that they provide relevant information. If there are TMDLs or impaired water bodies, you wanna make sure that they're aware of where these sites are, where the inlets are that may have potential for problems if they're not protected properly. So all the particular information is relevant, background history of that site that may have some bearing on how that construction activity proceeds. You also wanna include provisions in the federal contracts...

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[00:40:05]

for construction projects so that they'll know that if any particular penalties are employed at this site, then that contractor may be also responsible for paying for that particular fine. You want to update your Stormwater Pollution Prevention Plan, again, it's a living document, so that any time the inspector goes out there, any relevant changes to that site should be reflected in that pollution prevention plan. You wanna train your staff properly. And if you have contractors, you wanna make sure that they're trained properly to recognize those problems...

[00:40:35]

at sites. You wanna also keep effective communication between the contractor and the general contractor, any subs, anybody that's related to dealing with the activities at this site and there is proper communication, so that if there are problems, they could be corrected efficiently and effectively. And that concludes my presentation, and if you have any additional questions that may not be answered here, you can e-mail me or give me...

[00:41:05]

a call. I'll be glad to put you in the right direction.

TOMMIE JEAN VALMASSY

Great. Thanks, Mike. And as you can see on the screen, there's Michael Mitchell's e-mail address. So we did have some questions come in. We are running a little bit short on time, so I'm just gonna try to ask you one or two quick ones. Is there an example of a good SWPPP that could be made available to people? Kind of a template or just an example of one that was really good?

MICHAEL MITCHELL

On EPA's Website...

[00:41:35]

there's a--I think on the construction site with the documents, there's good examples of what SWPPPs would look like. Now, EPA does have a guide manual, Developing a Stormwater Pollution Prevention Plan, and that document is available and downloadable on the Website. And, again, it's really updated to show and reflect how to develop a pollution prevention plan. There's a couple of checklists and other related documents...

[00:42:05]

and so on, and it provides a good background material for that.

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TOMMIE JEAN VALMASSY

So if folks go to epa.gov and then where would they go in there?
Is there a header or something?

MICHAEL MITCHELL

Yeah, it's epa.gov/npdes/stormwater, that puts you on the Website
and there is a--on the left-hand side, you can click construction
and then it will take you to a construction page...

[00:42:35]

where you can actually download particular documents as it
relates to the Construction General Permit and developing
pollution prevention plans.

TOMMIE JEAN VALMASSY

Okay, great. Well, I don't wanna short our other presenters. So
I'm gonna have to move on to our second presenter, Michael
Prescott. Thank you to those who did type in questions, and I'll
make sure that Michael Mitchell gets those and we'll get
responses to you.

MICHAEL PRESCOTT

So I just go ahead, Tommie?

[00:43:05]

TOMMIE JEAN VALMASSY

Yup. I'm pulling up your presentation and here we go. We are on
your first slide.

MICHAEL PRESCOTT

Which says what? Unfortunately I don't have the slides. I can't
see how they're proceeding. So, is that the [OVERLAPPING]?

TOMMIE JEAN VALMASSY

I'm sorry. So your Inspector Observations of Construction Sites.

MICHAEL PRESCOTT

Very good. Hopefully everybody can be patient with me since I
can't see what's actually up on the screen. I'm gonna give a
presentation from an inspector's point of view based on my
observations during inspections of federal facility construction
sites. What I'm gonna cover are...

[00:43:35]

common violations both the permit and record-keeping type and
the actual site violations. I've got some photographs of some of
the site problems I've seen. I also have photographs of some

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good site practices to show you, and then I'm gonna cover some root causes for these violations and some potential solutions. Next slide, please. Just a brief summary of my experience, I'm a contractor inspector with 30 years experience. I've conducted over 220 compliance evaluations inspections of federal facilities...

[00:44:05]

and actually I've now inspected 15 construction stormwater sites from a couple of weeks ago. There was 15th one, and unfortunately, a hundred percent of those have been in noncompliance. Next slide, please. Some of the more common permit and record-keeping violations that I've seen, the more obvious, didn't even apply for the stormwater permit for the construction site, or that the stormwater pollution prevention plan was not prepared or not on site.

[00:44:35]

And then we've seen stormwater pollution prevention plans that were not adequate. They were either very generic, or they just didn't get specifics on sediment and erosion controls. And then some are just very incomplete. Now, the common record-keeping violation has to do with the required site inspections. Many times, they're not conducted as often as they're supposed to or not at all. Somebody leaves and it just stops, and then...

[00:45:05]

sometimes they're just not documented. There's no reports, or they're not adequately documented. In the next slide, we're gonna talk about common site violations. BMPs or Best Managing Practices that is specified in the Stormwater Pollution Prevention Plan are not implemented. In other words, the engineer in the plan specified certain BMPs be implemented, and they weren't implemented, or they weren't maintained. And after storm events, many BMPs are...

[00:45:35]

damaged and need repair or a clean-out. So that's a common concern that we see on sites. And then project conditions can sometimes change, and BMP should be adjusted as needed to prevent stormwater contamination. This is not always kept up with. In addition, if the people conducting regular inspections are good, they will likely have recommendations for BMPs and corrective actions after they have done these inspections. But, unfortunately, these recommendations are not always...

[00:46:05]

implemented expeditiously, particularly before the next storm event. So in the next slide, we're gonna establish some pictures of some of the inspections I've done and sites I've seen. And these are

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some pictures of sites with deficiencies. This photo shows evidence of obvious accumulation and discharge of sediment in and around of the storm drain. Next slide, please. Somewhere in all that mud is a...

[00:46:35]

fabric filter over a storm drain that is working. But the filter is built up and should have been removed to ensure proper operation and prevent breakthrough. Next slide, please. This should be a photo of a hill, and you can see obvious signs of erosion that should have been prevented with controls at the top of the hill, and because of that, you now see this furrow of where the water is eroding down to the ditch that's below.

[00:47:05]

Next slide. It's a picture of a silt fence. The silt fence has been working, but obviously there's way too much sediment that's been built up against the fence and needs to be cleaned out before it is overrun or damaged. I think that's probably one of the more extreme evidence of something like that you'll ever see. Next picture please. This photo shows where there are holes under the silt fence, where the storm drainage has undermined the fence...

[00:47:35]

and it's flowing away from the site. Next picture, please. This is a small sedimentation trap with riprap help to contain silt from flowing downstream, which is great that they put this in, but unfortunately it's lost its effectiveness because it is not being cleaned out and the sediment is allowed to build up. Next slide, please. Here's another example of a silt fence being undermined by stormwater drainage....

[00:48:05]

under the fence and the sediments leaving the site. Next slide, please. And here is the stormwater drainage. You can see that the silt is being undermined underneath the silt fence and is being allowed to build up and leave the site. And at this particular site, the silt flowed down the pavement to a storm drain. Okay, the next slide, please. You should see...

[00:48:35]

examples of good site practices. I do have some pictures of some good site practices, unfortunately, I don't have too many of these. But I'll show you those. Next picture. This is a typical construction site with hay bales to protect the drain inlet around the middle of the picture. And then, what's also nice is the access road is above grade of this site, so that it prevents drainage from leaving the site. Next picture, please.

[00:49:05]

Another storm drain inlet with hay bales for protection. Next picture. A view of a silt fence around the construction site has been kept up and there's no holes underneath that had build up. Then the last picture. This is a view of a silt fence in the foreground and there's a sedimentation trap in the back that was catching sediment from a newly constructed parking lot. So these are some couple of good examples of what the construction site should look...

[00:49:35]

like. Okay, this one should say the typical root causes of violations. But some of these problems that we have--and it gets back to the construction contractors are interested in completing their projects, and many times they're not that interested in stormwater controls. In addition, there is a lot of turnover like contractor, employees and managers, which really causes problems. I've been to some sites where the project was only a year old and they had three foremen...

[00:50:05]

and a whole lot of other people, and it just kind of what started out with good intentions goes by the wayside with each turnover of a person. Also, federal agencies rely too much on the contractors of the Army Corps of Engineers to ensure compliance. And my experience has shown that this was a result in noncompliance many times. [INDISCERNIBLE] when the federal facility relies on contractors, many a times there is little or no oversight and these problems occur. Additionally...

[00:50:35]

most of the construction sites I've visited had not been inspected by federal, state, or local inspectors. So many construction site personnel have no experience with an inspection and probably don't even think that it will occur. So those are some of the problems that are caused by it. And then finally, large storm events always create problems. This is a given that cannot always be prevented. However if those problems would be corrected expeditiously...

[00:51:05]

that would help mitigate future problems. Next slide. Solutions. Federal facility staffs can help by inspecting these construction sites for compliance and provide that objective eye with the local knowledge of the watersheds. Of course, to make those inspections pay off, there has to be a connection with the contractor typically through the contracts monitor, and procedures should be worked out in advance of awarding...

[00:51.35]

construction contracts and provisions. Put in those contracts to make sure that there are repercussions and immediate fixes. It's really nice when I've seen the federal facility staffs actually go out and look at the sites and they've got this connection with the contract monitor so things happen. But more often than not I hear, "Oh, I can't do anything. I have to tell the contract monitor, who has to tell them and it just doesn't get done." So if that kind of communication and connection and...

[00:52:05]

provisions in the contracts can be set up in advanced that will really give you help and that a better leg up on getting a compliant construction site. Then another solution is to have a third-party contractor conduct regular inspections and provide recommendations to all the parties to ensure they are addressed. I saw this at a couple of facilities where they actually had a third-party contractor, and the actual site conditions were much more in compliance than they would...

[00:52:35]

be otherwise. There were still some paperwork concerns but that third-party contractor helps. It really helps when the employee of the contractor has to go tell his boss that he needs to change his procedures or he needs to provide resources to fix a problem. And that doesn't always when it's the same company that's doing it. I've seen that the third-party contractor can be built into the construction contract as a subcontractor...

[00:53:05]

but an independent contractor is better. So, I guess I went a little quicker. I guess I talked a little faster but that probably makes up and helps us catch up with time.

TOMMIE JEAN VALMASSY

It does.

MICHAEL PRESCOTT

Thank you very much and I'll turn over the webinar to Lee.

TOMMIE JEAN VALMASSY

Great. Thank you. So Lee, let me pull up your presentation here and if you have questions for Michael Prescott, we will be answering those. So we're just gonna do it for Michael and Lee at the same time. And so, Lee, the floor is yours.

[00:53:35]

LEE HANLEY

Okay. Great. With the first slide. I just wanted to kind of maybe pull together what Michael Mitchell and Michael Prescott said and iterate a couple of things that are very important when we do inspections here at Region 8. Region 8 does direct implementation of the NPDES program at federal facilities in Colorado and of course one of those...

[00:54:05]

NPDES programs is stormwater. We find that there are two things that most impact the success of stormwater at our federal facilities. And the first is the federal facilities involvement or management of the construction site through their MS work permit. The second of course is having a complete and adequate SWPPP. It's very crucial...

[00:54:35]

that the SWPPP be adequate as was earlier discussed. It is a living document and evolves with changes with the conditions of the site. If it doesn't, the chances of violation are highly probably. With the next slide, you'll see a photograph of a site. Next slide. This is a road construction...

[00:55:05]

that the operator was very knowledgeable about the stormwater but chose to do its inspections once every 14 days. Here in Colorado, we have what we call the gully washers. They come down very quickly in large amounts but only for a short duration and it may not exceed a tenth of an inch of rain but it's at enough force to cause erosion...

[00:55:35]

and sediment or pollutants off site. It's important to know that when EPA does an inspection, it's a one-day evaluation. Therefore, when we do our inspections which are unannounced and random, we look at the adequacy of the SWPPP, what it calls for, the inspections that are conducted by the operator, and then try...

[00:56:05]

and get a picture of what is occurring at the site. With this information, we can go back and make a determination if an enforcement action or a penalty is warranted. With the next slide, you're seeing a storm drain that is already connected to the MS4. This is one of the reasons why we find that...

[00:56:35]

working with the federal facility is very important because their MS4 is considered part of the waters of the U.S. This particular

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storm drain drains to a tributary that's only a quarter mile away. I think what's unique about the Colorado federal facilities is that their drainages go to waters that...

[00:57:05]

already have contentious issues, and so we wanna make sure that what we require of the state to implement for stormwater is also being complied with at the federal facilities and that we are not contributing to the pollutant loading that is occurring in these tributaries. With the next slide, you'll see another...

[00:57:35]

storm drain where the BMP is inadequate and the potential for sediment loading is quite high. It turns out, in this case, that this is actually the BMP that was justified in the SWPPP. So the question is when the operator did its inspection, did it go back and made the proper modifications so that it would minimize...

[00:58:05]

sediment loading into the storm drain? One of the issues that is hardly addressed in SWPPP is post-construction management. Storm drains doesn't normally contain clean-out, and therefore when you get precipitation, a significant amount...

[00:58:35]

the sediment that is or the pollutants that are deposited into these storm drains do get carried to the tributaries. So just to wrap up, we find that the success of the stormwater program really depends on having a good SWPPP. It depends on implementing that SWPPP, and...

[00:59:05]

it's also the oversight that the federal facility does at these construction activities. In terms of penalties, we have done two types. One is an expedited settlement offer which is kind of like a parking ticket for first-time offenders, and the second type are administrative penalty orders. In Region 8, we...

[00:59:35]

have--the penalties have ranged from about 14,900 to about 40,000. We have a couple of other cases in place and their penalties will be considerably larger. I think that's about it for me. Unless there are questions.

TOMMIE JEAN VALMASSY

Great. Yeah, there definitely are questions, so we have some for both Lee and for Michael Prescott.

[01:00:05]

How long after--let's say that there is some kind of a change at the site, how long after that change does the SWPPP have to be

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updated?

LEE HANLEY

When an inspector is looking at the records, we're looking to see that those changes are done immediately.

TOMMIE JEAN VALMASSY

Okay.

LEE HANLEY

The SWPPP is...

[01:00:35]

a living document. And so whenever things happen or changes, they should be recorded as quickly as possible either on the living map or on the SWPPP itself.

TOMMIE JEAN VALMASSY

Okay. And someone asks, "Does EPA have an outreach program similar to the way OSHA does where a contractor can request a voluntary inspection after the site has been prepared to make sure that they have their effective implementation of their SWPPP?"

[01:01:05]

LEE HANLEY

EPA does try to do compliance assistance. The program has been in place for quite a few years, almost two decades. And there are a lot of training courses or programs out there for contractors to go to that. We can direct them--can direct...

[01:01:35]

operators to attend. But we don't recommend any one particular program or another. We have limited resources, so we can answer your questions as much as possible. But to do onsite training or do pre-inspections...

[01:02:05]

is not very likely, at least not with Region 8.

TOMMIE JEAN VALMASSY

Okay. Another question about best management practices. We have a few questions about this. Can someone clarify? So in general, best management practices are usually suggestions, not necessarily requirements. Is that true in the SWPPP? Or, are the BMPs really more than recommendations, they're really requirements?

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[01:02:35]

LEE HANLEY

BMPs are site specific. They are not recommendations. Whoever is evaluating or designing the SWPPP should have a good idea of topography, conditions, design of what is going to happen at the site and should design the BMPs to ensure or to minimize pollutant...

[01:03:05]

or sediment runoff. So, no, they are site specific and there are many areas--you can go to the EPA Website for some suggestions on BMPs and there are many other trade organizations that publicize different types of BMPs. But, no, they are site specific and the SWPPP should be site specific...

[01:03:35]

in what will be implemented.

TOMMIE JEAN VALMASSY

Okay.

MICHAEL PRESCOTT

And this is Michael Prescott. I just--my opinion, if the engineer specified that these BMPs are needed, and he should in the stormwater pollution prevention plan, then they're not suggestions. They should be implemented and must be implemented. And I'd look for EPA to confirm my opinion on that.

LEE HANLEY

That is correct. When we go and do an inspection, we are looking to see if the BMP that's specified in the SWPPP...

[01:04:05]

is the actually implemented control. If it is not, then that would be considered a problem, and it should have been identified by the operator when they go out and do their regular inspections.

TOMMIE JEAN VALMASSY

Okay. Great. Thank you. So I had asked a question about updating the SWPPP if there's some kind of a change. We got a few questions...

[01:04:35]

about that also. Can people just kind of pen and ink in the changes? It's a document that goes through a lot of review and people are saying that it might be kind of time intensive to re-cement the whole SWPPP and everything, so is that acceptable to just make some hard-copy changes?

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LEE HANLEY

We have accept--and this is Lee and then I'll speak for the inspector's point of view and the answer...

[01:05:05]

is yes. We have seen SWPPPs that are modified by handwritten or pages inserted. It is important, however, that when you make that change, you initial and date when the change is made.

TOMMIE JEAN VALMASSY

Okay. All right, so that answered quite a few questions here. So we still have a few more questions and if you have more questions, you can go...

[01:05:35]

ahead and type these in. And I know a few people said that they weren't able to see all the pictures, it wasn't uploading quickly enough, so I just wanna let you know I'll send out a link where you can get copies of the presentations and you can download a PDF of those and refer to those more closely. One person asks and I think this is for Lee and Michael. Have you had any experience with spill response personnel for vehicle fluids leaking on porous pavement or pavers?

[01:06:05]

LEE HANLEY

Could you repeat the question again?

TOMMIE JEAN VALMASSY

Yeah. Have you had any experience with spill response personnel responding to vehicle fluids leaking on porous pavement?

LEE HANLEY

One of the questions that I always ask when we're on a site is the fueling program. If the fueling is done by the fuel...

[01:06:35]

vehicle brought in, then the question is who has a response kit and who has the responsibility to address any spills.

TOMMIE JEAN VALMASSY

Okay.

LEE HANLEY

So I don't know if that answers the question.

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TOMMIE JEAN VALMASSY

Well, and if it didn't, the person who wrote it, you can go ahead and write back in. Here's another question and I think this might have even been from when Mike...

[01:07:05]

Mitchell was presenting, but maybe one of you could answer this well. We have a question about land disturbance, that term was used, and specifically cleaning and grading. That obvious is a disturbed area, but are there shades of gray for what includes land disturbance? For example, would resurfacing a paved area be considered land disturbance?

LEE HANLEY

From an inspector's point of view, yes.

[01:07:35]

TOMMIE JEAN VALMASSY

Okay.

LEE HANLEY

Any time you move anything. Any type of ground disturbance.

TOMMIE JEAN VALMASSY

Okay. Another quick question about the SWPPP changes. So you mentioned you make those changes and date it, and then do those changes have to be approved and signed by the design engineer, architect or the professional engineer?

[01:08:05]

LEE HANLEY

The SWPPP is signed by a person of responsibility or a person knowledgeable about implementing the SWPPP. So if changes are necessary like for example a BMP that was designed by the engineer is not working...

[01:08:35]

but they--and so they have something else that they need to try, that can be done. It doesn't necessarily have to be approved by the initially approving engineer, but it needs to be approved by the person implementing the SWPPP. Again, changes can be done to the SWPPP because it's a living document, but...

[01:09:05]

it's important that the change be identified, be initialed and dated.

TOMMIE JEAN VALMASSY

Okay, great. Thanks for that clarification. Well, thank you so much to Lee Hanley and Michael Prescott. We need to go ahead

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and move on to our next presenter, Robert Goo. But if you still have questions for Lee and Michael, go ahead and type those in and what we'll do is we'll just forward those on to them. And so, Robert, let me hand over the control to you.

[01:09:35]

ROBERT GOO

I'm here. I don't know how to get my presentation on the screen yet. Here it goes, sorry.

TOMMIE JEAN VALMASSY

That's okay. Great, working your presentation.

ROBERT GOO

Can you see my presentation?

TOMMIE JEAN VALMASSY

Yup, we sure are, so the floor is yours.

ROBERT GOO

Okay. I am going to talk about...

[01:10:05]

the Energy Independence and Security Act and Section 438 which pertains to stormwater management. I'm having trouble advancing this slide here. As we all know, that stormwater is a major problem in the U.S., and this just--this slide just illustrates the magnitude of the problem. And if you look at this slide, it just represents the percentage of...

[01:10:35]

impaired waters that have been assessed. So we think this number is much higher than actually reflected in this table. So the Energy Independence and Security Act of 2007, I'm gonna read it. "The sponsor of any development or redevelopment project involving a federal facility with a footprint that exceeds 5000 square feet shall use site planning, design, construction and maintenance strategies for the property to maintain or restore to the maximum extent technically feasible, the pre-development hydrology of the property...

[01:11:05]

with regard to the temperature, rate, volume, and duration of flow." This is--the important thing here is--and I have another slide that emphasizes this--is that you're addressing flow and temperature in a way that's a departure from conventional stormwater management where you typically looked at controlling runoff to prevent flooding. This is--this act was designed to try to address

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- the water quality implications of the changes in...
- [01:11:35] the landscape resulting in impervious surface contribution as to increased flow. So we--the statute was unclear about who would implement the provision. And in response to this void, EPA approached the Interagency Sustainability Workgroup, which is comprised of the VA, Veterans Administration, Department of Defense, General Services...
- [01:12:05] Administration, and various other federal agencies, and suggested that EPA might take a first whack at trying to develop technical guidance to clarify what was intended by Congress in the act. And so we developed draft guidance, which I'll go into more detail, but this is sort of the outline of what's in the guidance. These are salient terms that were in that short paragraph. And...
- [01:12:35] unfortunately, Congress did not define the maximum extent technically feasible and, again, left it up to the implementing agencies much in the way they gave us maximum extent practicable. So we tried to define what METS is in the guidance. The other important terms that are here in the statute are predevelopment hydrology, which is--well, we defined in the guidance, and then the need to...
- [01:13:05] control volume, rate, duration, and temperature to pre-development levels. In terms of applicability, the statute applies to--the previous question on this issue--all facility related construction. That's projects associated with buildings and associated infrastructure, including parking lots and access roads for both new development and redevelopment. We did have some questions earlier about whether a parking lot rehabilitation project would constitute land...
- [01:13:35] disturbance. If you were ripping up the pavement, we assume that that would be covered under this provision. If you were just filling potholes, we assume that it would not be. This slide represents the change in runoff based on change in impervious surface due to change in land use. And as you increase your impervious surface area, you have stream-related impacts, less infiltration, and evapotranspiration, and more runoff.
- [01:14:05] And we believe that this legislation was intended to address these issues to try to protect the receiving water environment and prevent channel--stream channel degradation and habitat

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destruction. This hydrograph just represents the change in runoff based on increased impervious surface and represents the fact that you typically get a higher peak discharge and it's attenuated versus the pre-development condition. And what we're trying to do is replicate the...

[01:14:35]

pre-development condition through good design. These graphs represent the change in the volume--runoff volume and the timing based on land use change that is increased in impervious surface, so that the magnitude is greater and the duration is longer. This slide represents the changes to stream channels based on increased flow volume and runoff rates. The...

[01:15:05]

historic cross-section is much smaller than the current cross-section and we believe as you increase the impervious surface area and the contributing runoff volumes, and an increase of runoff velocities that the ultimate cross-section will get even larger, thus degrading habitat, increasing discharges of sediments, leading to stream warming and habitat destruction. This is just a photo of a degraded channel which is happening throughout our urban areas and you've all seen...

[01:15:35]

many examples of these kinds of impairments. So, what we believe the legislation was trying to address was to push us, to move us from trying to just manage flow and manage our runoffs so that we replicate it--replicate pre-development conditions, and use natural systems to try to maintain predevelopment conditions in terms of flow, volume, temperature and...

[01:16:05]

runoff rate. And we believed that the use of green infrastructure practices, that is use of infiltration, evapotranspiration, and rainwater capture and use through a good site design, neighborhood design, and water conservation and use are the best ways and the most cost-effective ways to manage runoffs. And we're defining green infrastructure for the purposes of...

[01:16:35]

this discussion as soil and vegetated systems, such as green roofs, trees, rain gardens, permeable pavements, and perhaps cisterns that mimic natural functions to manage wet weather. There's another kind of green infrastructure which is based on landscape ecology that is a network of corridors and nodes, and...

[01:17:05]

open green space that represents ecological integrity. And so these strategies integrate well with both kinds of green

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infrastructures, both green infrastructure for wet weather and then green infrastructure on an ecological scale. I just wanted to make that distinction, because there are two different audiences using different terminology. So, we believe that green infrastructure...

[01:17:35]

for wet weather has multiple benefits, both societal benefits, public health benefits, aesthetic benefits, decreased energy use, increased resilience of systems and infrastructure to climate change, and improved air quality, maintain ground water base flow, minimum stream flows, and reduce pollutant discharges associated with runoff. Typical green infrastructure practices, this is just a primer. I'm gonna...

[01:18:05]

go through these very quickly, amended soils, bioretention systems, permeable pavements. I'm gonna show you some examples of these. This schematic represents a project we worked on at the EPA headquarters in an effort to model good behavior and implement some of the ideas behind what we're proposing in the guidance, in the drafts, Section 438 guidance, where you capture runoff, use it for irrigation or potable or non-potable...

[01:18:35]

uses inside the facility, and you create bioretention to infiltrate the runoff and provide vegetation to evapotranspire the portion of the runoff. These are pictures of the cisterns in the EPA headquarters building which is a part of that schematic. I'm gonna go through a bunch of pretty pictures of examples of kinds of practices that we believe people should be using that we're calling green infrastructure for wet weather.

[01:19:05]

This is gutter disconnection, so you're designing the systems to discharge into grass or vegetated areas, so that they'll infiltrate into the soils and not run off and cause stormwater runoff or combined sewer discharges. Bioretention system, these are typically engineered systems with an engineered media. Sometimes they have underdrained, sometimes they don't, and they're designed...

[01:19:35]

typically to capture and infiltrate or treat a specified volume of runoff. Open swells, these are conduits or conveyance systems that replace typical channels or pipes, and they're using vegetated systems to slow and treat the runoff. Parking lot island infiltration areas, these are basically bioretention systems or rain gardens within a parking lot context, the...

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[01:20:05]

lower middle photograph is of the U.S. naval yards where we pioneered some bioinfiltration designs. Rain gardens are less engineered than bioretention systems. They're typically just shallow depressions filled with media and then planted to absorb and soak in the runoff. And then permeable pavements and porous pavements, concrete, asphalt, pavers, interlocking concrete...

[01:20:35]

pavers, they all serve the same purpose, but provide you a transit area and also can handle increasingly heavier loads. So they're one alternative where you can't use vegetated soil-based systems to treat your runoff. And then green roofs which are typically used in urban retrofit areas where you don't have adequate land area to treat your runoff. Soil amendments and structuring, typical urban soils are compacted...

[01:21:05]

and degraded so much that they don't infiltrate runoffs. This is a technique to revitalize it and restore the infiltrated capacity of the systems. Planters can be used in ultra-urban environments, public right of ways, the city of Portland, Seattle, Washington, D.C., many cities, Philadelphia are all using these systems aggressively because of the lack of land area, and they think they provide both communities aesthetic value as...

[01:21:35]

well as functional stormwater value. This is an idea that we're really pushing hard now. Use of expanded tree boxes for street trees and plazas, you increase the longevity of the trees, the size of the tree canopies, the interception percentage and you also provide stormwater volume control in the root-soil media area. So in terms of the Section 438 guidance...

[01:22:05]

the organization and the guidance really provided some background, talked about benefits, what we think compliance with Section 438 means. I should note that we are currently in a dialogue with various federal agencies, chief amongst them, Department of Defense and GSA regarding what the draft guidance will be finalized into and how some of the terms will be defined...

[01:22:35]

and then we talked about how do you meet METF, maximum extent technically feasible, and how do you calculate the 95th percentile rainfall event, and then we provide some case studies. I'm gonna through these points. Performance options, option 1 is

[01:23:05] control the 95th percentile rainfall event. We felt that this was a reasonable objective because states and local governments are...

[01:23:35] meeting this objective in some of their existing requirements. Many states and localities are using the 90th percentile, but we felt that the 95th percentile more objectively met the intent of the legislation. So manage rainfall onsite to infiltration, evapotranspiration, harvest and use of the runoff. And I would define the 95th percentile rainfall event is that event which precipitation total is greater than or equal...

[01:24:05] to 95% of all 24-hour storms on an annual basis, and I'll show you a chart in a minute. Option 2 would be to preserve predevelopment hydrology, that's the rate, volume, duration and temperature on the site. This is a much higher objective standard, and this is really the true intent of the legislation. However, we felt that the 95th percent storm capture volume was more practical and easier to implement. To...

[01:24:35] meet this option, one must conduct continuous simulation modeling and look at the site conditions and model various scenarios based on soil type, slope, meteorology, et cetera, and the best management practices employed on the site. So this is much more difficult, but conducting this analysis may actually give you a better outcome at less cost in...

[01:25:05] some conditions because you've done the analysis, but we didn't feel that everyone had the expertise, the time or the need to use a continuous simulation modeling approach. Again, maximum extent technically feasible, what does this mean? We try to define what it meant in the absence of clear guidance. Stormwater control practices that are effective in reducing the volume of stormwater discharges must be used, use available and reasonable methods of stormwater retention or reuse...

[01:25:35] to prevent offsite discharge of stormwater runoff based on the performance standards that the respective federal agencies adapt as per the guidance or guidance that they determine is appropriate for their organizations. And then there's a third option, which I'll talk in a minute, where the site conditions would not allow either the use of continuous simulation modeling and pre-development and maintenance of pre-development...

[01:25:35] hydrology or capture and treatment of the 95th percentile storm.

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We had a comment from the Department of Defense that they wanted more detail on how they could comply with this legislation and how they could be made accountable for it in an effort to hopefully avoid citizen suit litigation or other actions by this council of environmental quality, whoever. And so...

[01:26:05]

in lieu--in the absence of direct authority for EPA to specify what the criteria would be and determine what was appropriate for each individual agency or department, we developed some criteria that we felt provide an objective basis to look at compliance with this legislation in a systematic way. We felt that these things are reasonable based on...

[01:26:35]

the intent of the legislation that is require site evaluation and soil analysis, calculation of the 95th percentile event or pre-development runoff volumes based on continuous simulation modelling, identification of the site design and stormwater management practices employed on the site, design calculations for the stormwater management practices so that you could determine or document how you met the performance objective based on the selection...

[01:27:05]

of best management practices and site design practices. And then operation and maintenance protocols to ensure that these systems would perform as designed over the long term. So this is the third option. We didn't really call it the third option in the guidance, but the third option is sort of--it's not a waiver but it's a way--in the case where you could not use Options...

[01:27:35]

1 or 2--that it's not technically feasible because of clay soils, other prior land use requirements, you would conduct the site evaluation and assessment, determine--you do develop a process to employ a systematic process that you went through to ascertain whether Options 1 or 2 were not feasible and why they...

[01:28:05]

weren't and then document why the agency had to take a different tack that is use an alternative design based on other site constraints or confounding factors. This is especially true where you have a redevelopment scenario and the use or the site conditions preclude meeting Options 1 or 2. And basically we felt if you have a systematic process, standard analytical process...

[01:28:35]

that has a justifiable design and it's credible given the site specific factors and that the public's needs are best served then we felt

that the agency would be in a defensible position to use an alternative design and defend that choice. So I'm gonna go through a few slides on terms of controlling a specified volume, the 95th percentile...

[01:29:05]

storm events, annual storm event in Washington D.C. is 1.7 inches; Seattle, Washington 1.6; Salt Lake, which has less rainfall, is 0.8. So you'll see the range of storm sizes, obviously, if the agency decided they wanted to control the 99 percentile, they could, but they'd have to defend that based on cost and performance and other factors. I wanna skip this slide. These are other examples of 95th percentile...

[01:29:35]

storms from around the country. It varies widely based on the degree of rainfall. Obviously some of these--or the intensity and duration of the storms so the designs would basically would be different in different geographic locations. I wanted to illustrate the fact that some communities in the states are adapting very stringent standards. Minnesota has adapted...

[01:30:05]

a requirement that you use green infrastructure to capture the 99th percentile. So this is a 3.4-inch storm and a 3.5-inch storm. So that's a huge volume. There are other requirements that apply that are driving better stormwater management, Greening Federal Facilities executive orders. The Chesapeake Bay...

[01:30:35]

has a new executive order that requires the Department of Defense develop Stormwater Best Management Practices, and we are hoping they'll use the Section 438 guidance and--to partly meet those requirements. There's the Navy low impact development policy for stormwater management. And there are a number of other greening high-performance buildings and other provisions that are all driving better stormwater management. So this...

[01:31:05]

isn't just one isolated piece of legislation that federal and state facilities are required to comply with. I like to note that this is--we've--in the guidance, we've designed it to be to write a performance standard, not a technology-based standard. We feel that performance standards allow design flexibility for compliance and don't stifle innovation and allow you to accommodate for site-specific...

[01:31:35]

factors and agency-specific practices and processes. So we do

went through a bunch of modeling scenarios to demonstrate how they calculate the 95th percentile event because we thought this was the methodology that most people would use. If they wanna go to continuous simulation modeling approach, they can do so and then they'll have to employ the requisite experts. I'm gonna go through this--let's see, I have a little bit of time left. The challenge is to make...

[01:32:05]

our urban land uses function like the historical land cover types--forest, meadow, whatever. And so when we went through this process, we looked at sort of the land cover and the meteorological data from sites around the country, and we try to pick representative facilities that represented the kinds of situations that...

[01:32:35]

federal facilities managers would have to design for. And so we picked sites around the country that had different kinds of--had larger 95th percentile runoff rainfall events. In Denver, we looked at--most of these sites are already built, and so we tried to use existing site conditions based--and we used a hierarchy of practices...

[01:33:05]

to manage a runoff. And we based the hierarchy on cost and effectiveness. So the hierarchy we used was bioretention systems first, permeable pavements second, cisterns, and then green roofs, in that order, because of their respective cost. The cheapest solution would be to use bioretention, obviously, if you had available land space. And so we went through these scenarios. We assume that you could...

[01:33:35]

you would still have to meet flood control requirements. And so we designed them to have offsite storage. But this--the flood control storage could also be on site. So we tried to factor in some degree of realism in terms of these designs. And the different sites had different site constraints. I wanna go more into the Cincinnati example, if I have time. Most of these sites, we tried to use bioretention as much as possible because that's...

[01:34:05]

the cheapest alternative. In this case, we were allowed--we were able to do so in Cincinnati, Ohio. In Portland, Oregon, you have long duration, low intensity storms. And this was a very heavily impervious site, 95%, so it represents urban core site. They were few opportunities for bioretention so we had to go with the green roof scenario which is much more expensive but it's doable based

on our modeling...

[01:34:35]

exercise. We didn't do cost for this analysis, but I will cover that in a minute. In Phoenix, Arizona where you have soils that infiltrate well, you just put in two bioretention systems as you met the requirements. So we feel this is a very feasible approach to design. Atlanta, Georgia, you have mixed conditions so bioretention, permeable paver blocks were the practices of first choice.

[01:35:05]

And you could--if you were to design a new site, you wouldn't do it this way, but these are sort of retrofit examples and so we try to use existing open space as our treatment system. In order to be practical, we wanted to look at some cost comparisons because, typically, the industry responds by saying, "The cost of low-impact development or...

[01:35:35]

green infrastructure practices is much higher. But we don't really believe that and we believe that there are cost savings that are possible with the use of a green infrastructure low-impact development practices." So we went through various site scenarios. This is a single-family residential development, 40% imperviousness. We didn't go with an environmentally sensitive site design. We just took a conventional, cookie-cutter subdivision and used the existing drainage system...

[01:36:05]

as the template or the baseline for looking at how green designs could meet the design performance objectives of the statute. And as you'll see, you can do it at lower cost, about the 90th and 95th percentile designs over traditional gray infrastructure which is the gray bar. This doesn't hold in all situations, obviously. Where you had higher degree of imperviousness in commercial development...

[01:36:35]

it's less clear that there's always a savings using green infrastructure but the savings aren't that much higher and they could be lower depending on the geographic location you're in, as in the semi-arid example here. So--and the other thing to remember is that you're getting much better performance. The conventional systems typically only address flooding and have very poor water quality performance, so...

[01:37:05]

you have to look at all the externalities of what you're trying to do as well. In terms of life cycle analysis, we feel that green

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infrastructure has lower life cycle cost over time. And that if you look at it over the entire lifespan, the green infrastructure will perform better both from performance and a cost perspective. In a high-density residential development, it's sort of mixed. Gray infrastructure is...

[01:37:35]

more expensive in the semi-arid areas but green infrastructure is more expensive in humid and semi-humid zones. So I think what this demonstrates is that if you play around with different best management practice designs based on your performance objectives, the cost will be similar or less in most cases. How much time do I have left?

TOMMY JEAN VALMASSY

You have about three or four...

[01:38:05]

more minutes.

ROBERT GOO

Okay. I'm just gonna go through this really quickly. This is EPA trying to walk the talk. I would like to note that General Service Administration is already putting the use of Section 438 requirements and all their requests for proposals, so they believe that this is implementable. And EPA has done some analysis using its own facility, its research facility in Cincinnati, to go through a scenario where they are actually...

[01:38:35]

redoing the facility and they're trying to figure out how to comply with Section 438. And Lisa Biddle, with ERG, provided these slides. She's been working with our facilities folks on this site. So it's about 44% impervious surface, and it's constrained by the lab design. So this is the process we went through. We assessed the rainfall distribution, performed the runoff analysis with three types of storm events: the 95th percentile storm event, the two-year...

[01:39:05]

24-hour storm and the 10-year 24-hour storm based on the need to meet state and local requirements as well as use of Section 438 requirements. We felt that was most realistic. Obviously, in some communities, you have to control for much larger storms, 50- or 100-year storms. But those are already existing costs you have to comply with so we didn't feel that they--it would be fair to incrementalize those costs. So this table represents the goals you're trying...

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[01:39:35]

to achieve--to comply with Section 438, meet the two-year 24-hour storm control for channel protection, and meet the 10-year 24-hours storm criteria for flood protection. So you're trying to do multiple things simultaneously, and we believe green infrastructure can help you do that. To figure out the 95th percentile storm, you look at all the storms over the period of record. The longest period of record you have is the best, and then you'd...

[01:40:05]

figure out the 95th percentile storm which would be 1.34 inches in Cincinnati. To meet the two-year 24-hour storm, you just use the NOAA Atlas and figure out what the number is and design accordingly which is a three-inch storm and then use NRCS TR-55, TR-20 methodologies to figure out what your flood control value will be and that...

[01:40:35]

is a four-hour storm if you look at the 10-year 24-hour storm. So then the next step you would do is you select the onsite LID options to capture whatever performance goal you're trying to achieve. That would be, in this case, the 95th percentile runoff and then determine what additional state and local control requirements applied and any other factors that needed to be incorporated into the overall design.

[01:41:05]

And so this is all we came up with: bioretention, green roof, permeable pavers. They're obviously--this was an illustrative exercise so you could decrease the amount of green roofs and put in more permeable pavement as long as you had the requisite rooting and flow paths, and so that would change the cost. I'm gonna go through the cost in a minute and I'll be finished. So we did a runoff analysis based on meeting...

[01:41:35]

the various requirements based on LID redesign and read existing conditions and the greenest predevelopment conditions so that we will have a data in order to size our best management practices that we felt met the performance goals. And then we'll use various combinations of best management practices: tree boxes, porous pavements, permeable pavers, bioretention system, swales, green roof cisterns to figure out what the total volume we...

[01:42:05]

needed to treat was and how we could do it based on standardized designs for those particular management practices. And then we'd look at the cost of implementing those designs versus the cost of traditional designs. So the subtotal for the low-

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[01:42:35] impact development system was 403,000. The next slide is actually more interesting where you have LID design scenario...

[01:43:05] the total design cost was 1.231 million. And if you use gray infrastructure, typical, conventional design, it was slightly more expensive. Obviously, there are a number of assumptions that were made in terms of the cost and the designs, but what we're trying to illustrate is that the LID designs can be less expensive or in the same cost ballpark to gray infrastructure with all the added...

[01:43:05] benefits. So anyway, that's all I had to say and I've been working very closely with Jenny Molloy in the Office of Wastewater Management who manages the NPDES municipal permit programs. And I'd be happy to entertain any questions at this point.

TOMMIE JEAN VALMASSY

[01:43:35] Okay, great. Thank you. We do have some questions come in, so let's go over some of those. You had those example sites that were selected. Were they selected...

[01:43:35] randomly or were they picked because the approach was technically feasible there? And did you find any sites where the approach maybe wasn't feasible?

ROBERT GOO

[01:44:05] We picked those sites sort of fairly randomly because we had existing data on them. Our contractors had worked on those sites. We would certainly welcome any sites that people would like to-- we're gonna develop further case studies and find more technical guidance. So...

[01:44:05] we didn't pick those sites because we felt they were the only ones that were feasible. We haven't found any sites where Option 3 would need to be employed, and we'd actually like to find a site like that and have a discussion about it.

TOMMY JEAN VALMASSY

Okay. Great. So someone asks, "How do the maintenance costs compare in the green versus traditional design? And have there been any long-term studies to look at those costs?"

ROBERT GOO

That's an excellent question. We have not...

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[01:44:35]

done the analysis regarding the maintenance cost. There's a paucity of data regarding long-term operation and maintenance of green infrastructure practices. We believe that it is not that high. Both for green roofs and bioretention systems, we feel that they continue to function with very little maintenance, and we are actually working with conduction life cycle analyses and have developed, in conjunction with Water...

[01:45:05]

Environment Research Foundation, the analytical tool to look at the costs of these systems over their life cycles. So we will have better data, and we do believe that the costs are fairly low and say in the case of green roofs, if you increase the longevity of your roof membrane that is double it, then your cost go way down. And the GSA has examples of green roofs that have been in place for, at least, 35 years and have not been leaking and they see...

[01:45:35]

no need to replace the roof at this period.

TOMMIE JEAN VALMASSY

Oh, wow, okay. Okay, well, here's another question, so someone writes one problem they often encounter in the Army parking lot construction in New York is that maintenance shops require permitting under the SPDES permit for industrial activity. So this and other stormwater permits encourage porous pavement to increase stormwater infiltration. However...

[01:46:05]

a state's reportable spill requirements say that any drop of oil that falls on an impervious surface may be classified as a reportable spill and, you know, military vehicles tend to leak especially when awaiting service. So any tips on how to rectify the need for stormwater infiltration with a desire to prevent soil contamination and having to report a vehicle leak?

ROBERT GOO

That's a good question. I...

[01:46:35]

think that's an extreme example of interpretation of protective statutes that probably has gone awry. Don't quote me on that one but we believe that these systems, bioinfiltration systems, permeable pavers and pavements have widespread applicability and use. However, they should not be used where you have the potential for groundwater contamination, significant groundwater contamination...

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[01:47:05]

that is where you're using--there's a lot of hazardous chemicals being used or discharged. We have not seen from any of our data evidence of groundwater contamination through typical residential and commercial use of permeable pavements. We have created some new fact sheets on that here at EPA dispelling some of those issues in terms of groundwater contamination and safety issues and maintenance issues.

[01:47:35]

But I would like to have a dialogue with that individual at some point to try to figure out whether this is actually a disincentive or impediment to using these technologies where it doesn't make a lot of real sense to interpret their individual state requirements in such a rigid manner.

TOMMIE JEAN VALMASSY

Okay, so Robert Goo's e-mail address is on the screen there, but we'll also make sure any questions whether we've answered them online...

[01:48:05]

or not, we're saving them and we'll forward those to all of the speakers. And I just wanna let you know, if you are raising your hand, we can't respond to those so just go ahead and type in your question. And so let's take maybe one or two quick little ones before we move on to Larry Woods. So, Robert, you talked about green infrastructure leading to conservation, use infiltration and ET, but don't many of your suggested BMPs treat and discharge?

[01:48:35]

ROBERT GOO

They do treat and discharge. If you remember the diagram and, I think, this whole presentation is gonna be posted at some point, a certain percentage of the rainfall will be infiltrated into the ground so discharged either into the groundwater soil interface or runoffs. We believe if there are runoffs, that the bioinfiltration systems will provide treatment through filtration, less with permeable pavements...

[01:49:05]

obviously, but there is some evidence that they're serving--that they're performing like trickling filters and you are getting some pollutant reductions.

TOMMIE JEAN VALMASSY

Okay.

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ROBERT GOO

I don't know if I've answered that question adequately, but I'm happy to entertain further discussion on that point.

TOMMIE JEAN VALMASSY

Okay, great, and we'll make sure that you get their contact information. And I did wanna mention that almost all of their presentations are available on Fed Center with the exception of Robert Goo's and, unfortunately, we just couldn't get it on there in time so later this week it will be posted there.

[01:49:35]

And the presentations will stay on Fed Center for probably at least a month so you will have a chance to go download those. And so, Robert, just one more quick question for you, has any thought been given to water management banking?

ROBERT GOO

We have not addressed trading in this guidance, the EPA does have people working on trading issues and I am happy to connect the person to those folks.

TOMMIE JEAN VALMASSY

Okay.

[01:50:05]

ROBERT GOO

We did talk about offsite mitigation in cases where on a watershed basis it would make sense to try to improve water quality off the facility's site.

TOMMIE JEAN VALMASSY

Okay.

ROBERT GOO

If anyone has any comments on the Section 438 draft guidance and would like to talk to us or other people associated with the development of the guidance, we'll be happy to entertain those discussions.

TOMMIE JEAN VALMASSY

And they should do that by e-mailing you?

ROBERT GOO

E-mail or phone call.

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TOMMIE JEAN VALMASSY

Okay, great. All right, well, we have some wrap-up...

[01:50:35]

slides with Larry Woods. So, Larry, let me pull up your presentations for you there and thanks, Robert. Okay, Larry, the floor is yours.

LARRY WOODS

All right, thank you. Next slide, you can go ahead to the next slide. First of all, I'd like to thank--thanks to all the speakers who came on and talked about...

[01:51:05]

stormwater and low impact development. That was very helpful. There are a lot of resources out there on EPA Websites, your basic stormwater information, stormwater management, low impact development. Next slide. Stormwater activities for construction, pollution runoff, a non-point source, and everyone can always go to fedcenter.gov and then just do a...

[01:51:35]

stormwater search to get lots of information on that. I'd like to thank everybody in the audience for participating in this. We had over 160 people that logged in and listened to this. And I wanted to remind you here that as this ends, you're gonna be prompted to fill out some survey questions and we'd really appreciate you taking five minutes or so to fill out the questions to help us evaluate this training.

[01:52:05]

And then there's an opportunity to type comments where you can give us ideas and thoughts on future trainings and other ways to improve this process. So, again, I'd like to say thank you to everyone, our speakers and our audience and to our contractor for helping set everything up. Thank you.

TOMMIE JEAN VALMASSY

Thanks everyone. This session is now closed.

[01:52:27]

[TECHNICAL]

[01:52:38]

END AUDIO