

**Evaluation of Drainage Outfalls  
FINAL REPORT**

**December 2021**

## **Chapter 1289, Item 430M, of the 2020 Acts of Assembly Evaluation of Drainage Outfalls**

### **EXECUTIVE SUMMARY**

Unmaintained outfalls occurring on private property in the Commonwealth's counties have been of growing concern, specifically as a source of recurrent flooding and associated impacts. Consequently, the General Assembly, through Chapter 1289, Item 430M, of the 2020 Virginia Acts of Assembly, directed the Secretary of Transportation and the Secretary of Natural Resources to evaluate the scope of certain drainage outfalls across the Commonwealth and recommend cost-effective solutions and means by which to fund the maintenance of such outfalls (the "Study"). While neither Secretariat has responsibility for the maintenance of outfalls in question, the General Assembly acknowledged that both may have insight on the scope of the problem and be in a position to provide recommendations for counties and private owners to implement.

Although the Study directs an evaluation of the scope of outfalls "with no assigned maintaining entity," the law prescribes that the entity responsible for maintenance is the owner of the land, or holder of a drainage easement, at the site of the outfall. Thus, in a strict legal sense, there are no outfalls without an assigned maintaining entity. There are, rather, outfalls that have not been adequately maintained by the assigned entities. The Virginia Department of Transportation (VDOT) is charged with the sole responsibility of maintaining outfalls located on state-owned rights of way, including appurtenant drainage easements in VDOT's name. As the subject outfalls are beyond state ownership, the maintenance responsibility necessarily rests with other entities such as the private landowner, homeowners association, developer, or county.

Due to the geographic breadth of the Study and its limited one-year timeframe, it was determined that an on the ground physical count and quantitative assessment of outfalls across the state would be impracticable. Rather, at best, the only feasible evaluation would be one that was conducted through an observational survey distributed (i) to VDOT's land use engineers given their knowledge of local conditions and (ii) to each of the Commonwealth's counties given their unique practices and understanding. The surveys were developed to qualitatively evaluate the perceptions of frequency, causes, and possible solutions to unmaintained outfalls from those who encounter such issues on a regular basis.

The process of surveying both state and local professional staff provided the opportunity to assess the relative impacts from county to county and, in total, 142 unique surveys were completed for counties throughout Virginia. The results revealed that the occurrence of unmaintained outfalls is a localized concern and appears across the state in varying degrees. In essence, the lack of clarity regarding owner responsibilities for these outfalls can result in

insufficient maintenance because such responsibility is unknown, erratically funded or, due to historical local processes, inadequately deeded in the land records. The lack of clarity regarding allocation of maintenance responsibilities, especially among private entities, has been identified by counties as the single most significant contributing factor that prevents adequate maintenance of outfalls. Furthermore, counties emphasize that there is currently a lack of adequate funding available to address ongoing maintenance of these outfalls.

Based on the Study's findings, the Secretary of Transportation and the Secretary of Natural Resources, with the support of staff, are providing the following recommendations for counties or private entities to implement with the intent to mitigate the consequences of unmaintained outfalls: clear communication of maintenance responsibility; creation of a pilot process for the systematic identification of existing unmaintained outfalls; development of a statewide best practices guide; and adoption of dedicated and innovative funding sources.

## **I. Introduction**

Chapter 1289, Item 430M, of the 2020 Virginia Acts of Assembly, directs the Secretary of Transportation and the Secretary of Natural Resources to evaluate the scope of certain drainage outfalls across the Commonwealth, and recommend cost-effective solutions and means by which to fund maintenance of such outfalls. Specifically, Chapter 1289, Item 430M, provides that:

*It is the intent of the General Assembly that the Secretary of Transportation and the Secretary of Natural Resources, in consultation with the Chairs of the House Appropriations, Senate Finance and Appropriations, House Transportation, Senate Transportation, House Agriculture, Chesapeake and Natural Resources, and Senate Agriculture, Conservation and Natural Resources Committees, and counties containing subject outfalls, shall evaluate the scope of drainage outfalls across the Commonwealth originating from Virginia Department of Transportation (VDOT) maintained roads with no assigned maintaining entity, and recommend cost-effective solutions and means by which to fund maintenance of such outfalls.*

Consistent with the legislation, this final report is hereby submitted to the aforementioned committee chairs on December 28, 2021.

## **II. Background and Legal Review**

The Study is directed at evaluating the frequency, causes, and possible solutions to unmaintained outfalls throughout the Commonwealth. An outfall is a point where surface and stormwater are discharged from a manmade channel, such as a ditch or a culvert.<sup>1</sup> At these points

---

<sup>1</sup> For purposes of the Municipal Separate Storm Sewer System (MS4) Program, Virginia law defines an outfall as the point where a municipal separate storm sewer discharges to surface waters and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances which connect segments of the same stream or other surface waters and are used to convey surface waters. (9 VAC § 25-870-10).

of discharge, especially during heavy rain events, the intensity of hydraulic flow can overwhelm an improperly maintained drainage facility and pose a risk to property from erosion and flooding.

In addition to focusing on outfalls without an assigned maintaining entity, the Study qualifies the evaluation of outfalls to those originating from “VDOT-maintained roads.” VDOT maintains the systems of state highways, defined by the Code of Virginia as “all systems of highways within the Commonwealth over which the Commonwealth Transportation Board exercises jurisdiction and control.” (Va. Code § 1-251). The systems of state highways include (i) the interstate system, (ii) the primary state highway system, and (iii) the secondary state highways accepted by VDOT for supervision and maintenance.<sup>2</sup> VDOT does not maintain the urban highway system, local roads in counties that have withdrawn from participation in the secondary state highway system, and private roads.

To understand the scope of outfalls specifically identified by the Study – outfalls with no assigned maintaining entity – it is important to review the legal obligations related to stormwater. Virginia follows the common law rule pertaining to stormwater, which “is considered a common enemy that may be fended off by each landowner” without further responsibility or liability. (*Norfolk & Western R. Co. v. Carter*, 91 Va. 587, 591-93, (1895)). But the rule is subject to modification in Virginia, whereby one’s efforts to fend off surface waters must not unnecessarily injure the property of another and must be exercised reasonably and in good faith and not wantonly, unnecessarily, or carelessly. (*Id.* See also, *Kurpiel v. Hicks*, 284 Va. 347, 354-56 (2012)). The modification of the common law rule adopted by Virginia provides that a landowner may not collect surface water into an artificial channel and pour it upon the land of another to his injury. (*Seventeen, Inc. v. Pilot Life Ins. Co.*, 215 Va. 74, 77 (1974)). Nor may a landowner interfere with the flow of surface water in a natural channel or watercourse. Where the water has been accustomed to gather and flow along a well-defined channel, which by frequent running it has worn or cut into the soil, he may not obstruct or divert it to the injury of another. (*Howlett v. South Norfolk*, 193 Va. 564, 569 (1952) (citing *Norfolk, etc., R. Co. v. Carter*, 91 Va. 587)).

Aside from these limited exceptions, the modified common law rule, which has been well settled in Virginia for more than a century, stands for the proposition that the owner of the land upon which the outfall is located bears sole responsibility and liability for the outfall, including the maintenance thereof. The obligation attaches to the fee owner of the property or, if transferred by easement, to the grantee holder of such easement. The rules apply equally to both private and public land owners, including political subdivisions and agencies of the Commonwealth.

Thus, in a strict legal sense, while the Study directs an evaluation of the scope of outfalls lacking an assigned maintaining entity, the law prescribes that such assignment of maintenance

---

<sup>2</sup> The “Primary state highway system” consists of all highways and bridges under the jurisdiction and control of the Commonwealth Transportation Board and the Commissioner of Highways and not in the secondary state highway system. The “Secondary state highway system” consists of all public highways, causeways, bridges, landings, and wharves in the counties of the Commonwealth not included in the primary state highway system and that have been accepted by the Department of Transportation for supervision and maintenance. (Va. Code § 33.2-100).

responsibility rests with the land, or easement, owner. Despite this straightforward rule, however, confusion and historical developments have nevertheless resulted in a number of outfalls that are not properly maintained because such responsibility is unknown, unfunded or, due to historical local processes, inadequately deeded in the land records.

### III. Methodology

Due to the geographic breadth of the Study and its limited one-year timeframe, it was determined that a physical count and quantitative assessment of outfalls across the state would be impracticable and that the only feasible evaluation would be one conducted through a qualitative survey distributed (i) to VDOT's land use engineers in the Districts and Residencies across the state and (ii) to each of the Commonwealth's ninety-five counties. The surveys were designed to solicit perceptions as to the magnitude of the problem arising from unmaintained outfalls, how such outfalls come into being, and any recommendations for cost-effective means by which to fund future maintenance needs. Both surveys were web-based and completed separately for each county. In addition to the responses submitted by VDOT's land use engineers, and with the assistance of the Virginia Association of Counties (VACo), thirty-four counties submitted responses to the Study. As of the date of this report, 142 unique surveys were completed for counties throughout Virginia. The spatial breakdown of where surveys were completed throughout the Commonwealth is depicted in Figure 1.

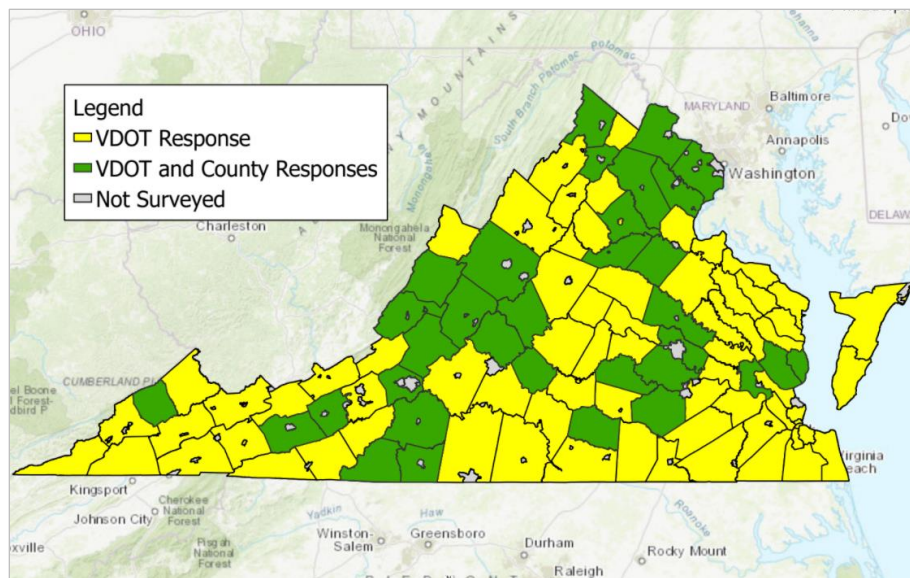


Figure 1. Geographic Locations of Completed Surveys throughout the Commonwealth

### IV. Analysis

The process of surveying both the counties and VDOT staff provided the opportunity to assess the relative impacts from county to county, as well as the varying local conditions and practices that might give rise to outfalls without an assigned maintaining entity.

### A. Scope and Occurrence of Unmaintained Outfalls

The data reveals that the occurrence of unmaintained outfalls appears across the state in varying degrees. As depicted in Figure 2, survey respondents were asked whether, and to what frequency, the subject county experiences problems regarding outfalls without an assigned maintaining entity. Although fewer county responses were received, the distribution of observations appears consistent when compared to those provided by VDOT and show that, while most counties experience some problems related to unmaintained outfalls, the degree of the problem varies from locality to locality, with almost a third of respondents stating that it is rarely or never a problem and a fourth of the respondents stated it is often or always a problem.

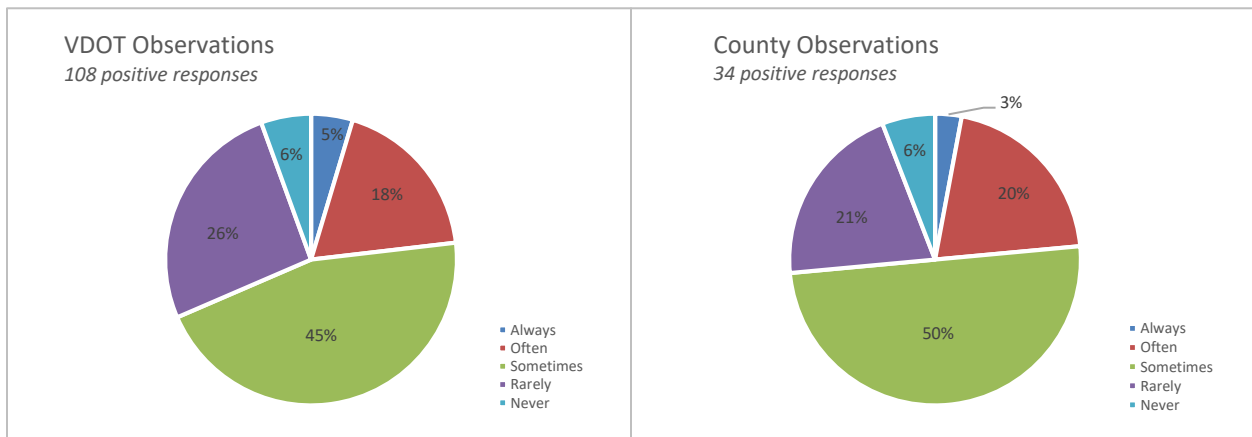


Figure 2. Responses received for the survey question: “In this county, have problems arisen regarding outfalls without an assigned maintaining entity?”

For those counties experiencing unmaintained outfalls, the degree of the problem also varies. As depicted in Figure 3, with regards to the size and magnitude of unmaintained outfalls, the majority of county responses identified that the occurrence is rare but, when occurring, can cause significant damage. In both surveys, a third of respondents stated that the occurrence of outfalls without an assigned maintaining entity is not much of a problem.

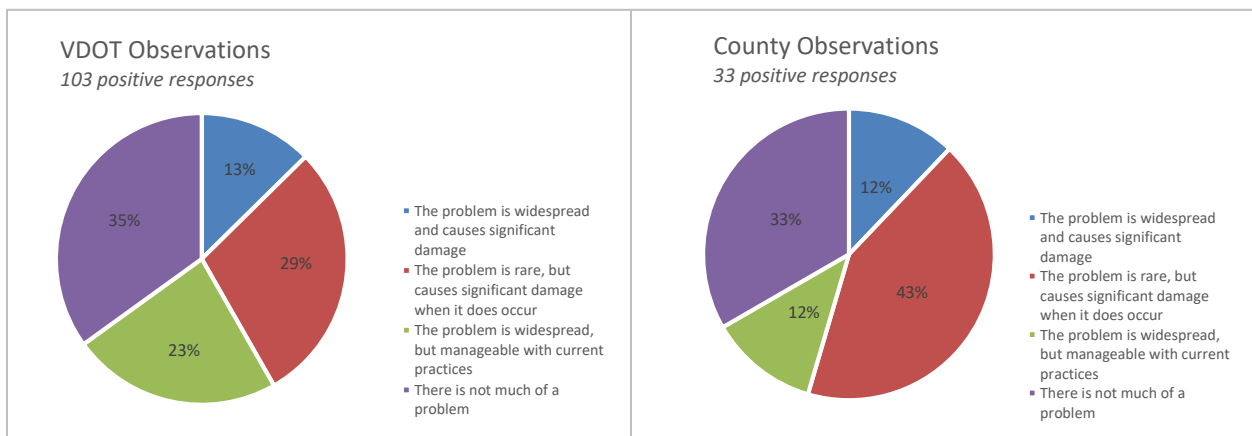


Figure 3. Responses received for the survey question: “How widespread and significant are problems arising from outfalls without an assigned maintaining entity in this county?”

The Study evaluated whether there was commonality for those localities stating there is not much of an issue within the respective county. Of the localities noting that outfalls without an unassigned maintaining entity is a problem that rarely or never occurs, many clearly allocate maintenance responsibility to the private landowner without further regulation. Other counties appear to benefit from having an operations and maintenance program that addresses responsibility for drainage and incorporates preventive maintenance practices. In contrast, those localities experiencing more significant impacts appear to have limited resources available to identify and address the problem on private property until prompted by a citizen complaint, by which time the damage from a lack of maintenance has magnified.

#### B. Historical Origins of Unmaintained Outfalls

To arrive at recommendations for this Study, the causes of outfalls occurring without an assigned maintaining entity must be examined. As discussed previously, the law provides that the owner of the land, or the holder of an easement, upon which the outfall is situated is responsible for its maintenance. This rule remains true of both public and private landowners. For example, VDOT is responsible for the maintenance of outfalls located on state-owned rights of way, including appurtenant drainage easements in VDOT's name. Without a right in ownership or easement, neither VDOT nor any other party has legal authority to enter private property.<sup>3</sup>

While the legal rule is clear, identifying the responsible owner may be complicated by historical developments and local practices related to the creation of the state highway system, the subdivision of land, and an inadequate legal transfer of responsibility. Figure 4 depicts the responses of VDOT and the counties when asked for the primary reason that outfalls without an assigned maintenance entity have come into existence. It should be noted there is a smaller sample size of county respondents compared to VDOT respondents, which may have led to differences in distribution. However, there is general consistency in the noted complications.

---

<sup>3</sup> VDOT's responsibility to enter outside of the dedicated right-of-way for drainage mitigation is limited to undertaking corrective measures to alleviate problems adversely affecting the safe operation or integrity of the roadway. (24 VAC § 30-91-110 (L)(3)(b)).

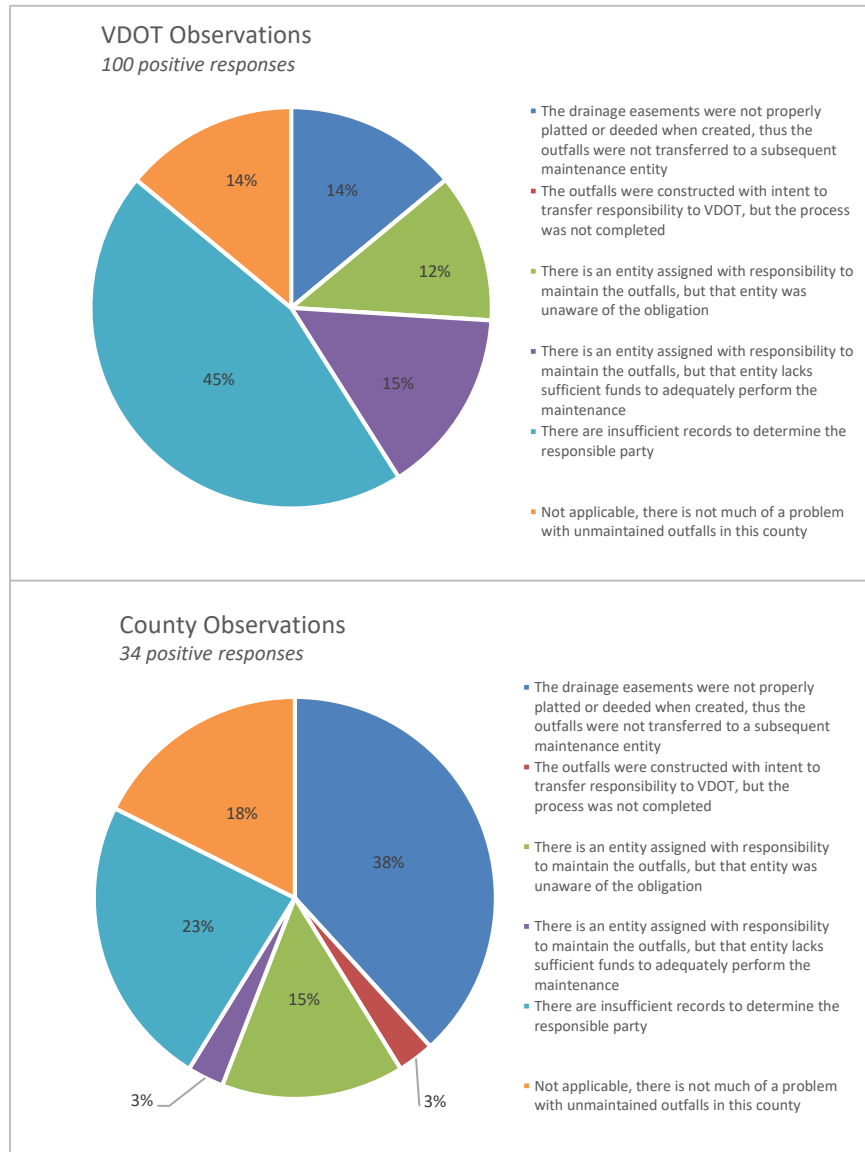


Figure 4. Responses received for the survey question: “Typically, in this county, what is the primary reason that outfalls without an assigned maintaining entity have come into existence?”

### 1. Creation of the System of Secondary Highways

Certain outfalls receiving stormwater from VDOT-maintained roads, but that occur outside of state-owned rights of way, may have come into existence as a result of the manner in which the state highway system was created. In 1932, the General Assembly passed the Omnibus Act, commonly referred to as the “Byrd Act,” and created the secondary system of highways by transferring the “control, supervision, management and jurisdiction” of county roads to the state highway commission. While the Byrd Act also transferred the power to exercise eminent domain, it did not expand any rights of property ownership for those existing roads.



Further, many of these early county roads were established by prescriptive easement rather than fee simple. By law, the state’s authority arising from a prescriptive easement is limited by a width of 30 feet, measured from the center of the road. (Va. Code § 33.2-105). It is possible that outfalls serving to remove stormwater from VDOT-maintained roads obtained by prescriptive easement remain outside of the state-controlled rights of way.

As depicted in Figure 5, 64% of VDOT respondents and 82% of County respondents indicated that unmaintained outfalls generally were installed after 1960, well after the passage of the Byrd Act in 1932. This response reveals that, while the transferal of county roads to the state pursuant to the Byrd Act is a contributing factor, the majority of unmaintained outfalls appear to have arisen with the local development and subdivision of land over time.

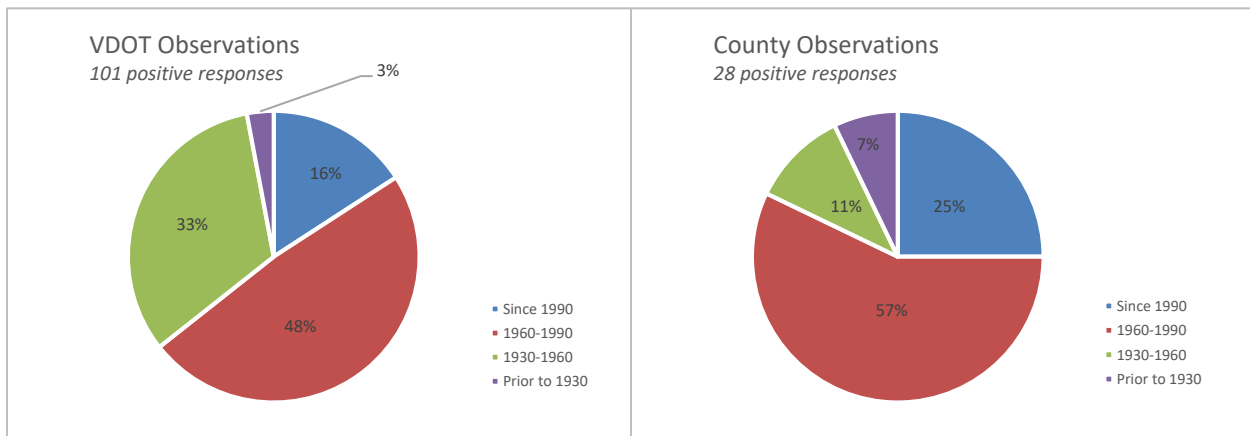


Figure 5. Responses received for the survey question: “If this county experiences problems from outfalls without an assigned maintaining entity, approximately when were such outfalls were generally installed?”

## 2. Land Development

The creation of the modern highway system through the Byrd Act is not the only historical development contributing to the problem of unmaintained outfalls in the Commonwealth. The development of land and the varying practices of deed recordation appears to have had the greatest effect. As provided above in Figure 4, when asked for the primary reason that outfalls without an assigned maintaining entity have come into existence, VDOT observations indicate that the insufficiency of historical land records and improper recordation of easements are the most significant causes of unmaintained outfalls. These interrelated factors identified by VDOT are also reflected by the county responses to the survey. Without a properly granted and recorded easement, the responsibility to maintain the outfall remains with the fee owner of the land. In order for another entity to take responsibility for the outfall, there would need to be a recorded easement. The processes for obtaining and recording such easements vary among local land record offices and have evolved over time.

When asked which entity is typically assigned responsibility for drainage easements when land is developed under current laws, VDOT and county observations show a relatively equal distribution among property owners, local governments, homeowner associations, and developers. As shown in Figure 6, where there are properly deeded easements, the majority are placed with private entities at the time of development. Since 1995, easements dedicated only to public use, however, are transferred to the county when the plat is recorded by operation of law. Section 15.2-2265 provides that:

*The recordation of an approved plat shall operate to transfer, in fee simple, to the respective localities in which the land lies the portion of the premises platted as is on the plat set apart for streets, alleys or other public use and to transfer to the locality any easement indicated on the plat to create a public right of passage over the land. The recordation of such plat shall operate to transfer to the locality, or to such association or public authority as the locality may provide, such easements shown on the plat for the conveyance of stormwater, domestic water and sewage, including the installation and maintenance of any facilities utilized for such purposes, as the locality may require.*

...  
*Nothing in this section shall obligate the locality, association or authority to install or maintain such facilities unless otherwise agreed to by the locality, association or authority.*

In these instances, an easement for public use does not give rise to a property right held by the Commonwealth.<sup>4</sup> Upon recordation, the county assumes maintenance responsibility.

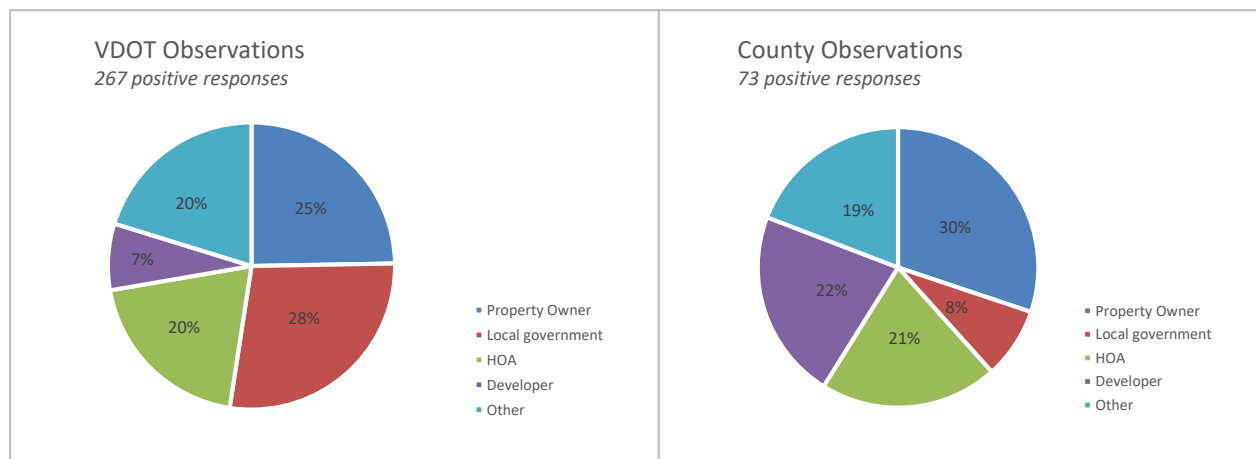


Figure 6. Responses received for the survey question: “For this county, during the development of land, which entity is typically assigned responsibility for drainage easements? (Check as many that may apply and/or explain.)”

<sup>4</sup> Pursuant to the common law, no property interest in land can be transferred to the Commonwealth by implication, whether plat or otherwise.

### 3. Subdivision and Secondary System Acceptance Requirements

Oftentimes, roads and appurtenant drainage facilities are constructed with an intent for the road’s ultimate transfer to VDOT upon acceptance into the state system of highways. This would include roads constructed by localities or developers that are subject to the design and construction standards for subdivision and secondary street acceptance requirements. Until the process for acceptance is completed, or until the appropriate standards are achieved, the responsibility for the road and drainage facilities remains with the landowner or easement holder, whether the county, a developer, or a private homeowners association. As part of the process to transfer the road into the state highway system, regulation requires an acceptable drainage easement from all outfalls to a natural watercourse and provides that VDOT normally accepts and maintains only that portion of a drainage system that falls within the limits of the dedicated right-of-way; drainage easements outside of the dedicated right-of-way are generally the responsibility of the county, developer, or homeowners association. (24 VAC § 30-91-110).

#### C. Practical Origins of Unmaintained Outfalls

In addition to historical developments, there are frequently other issues that might negatively impact the ability of an owner or easement holder to properly maintain the outfall even where ownership is clear. Chief among these issues are a lack of awareness of such responsibility and a lack of funding or enforcement capabilities at the local level.

##### 1. Commingled Water Sources

Several county respondents expressed confusion regarding maintenance responsibilities when the stormwater flowing through the outfall appears to be commingled from several sources. As depicted in Figure 7, when asked whether unmaintained outfalls are carrying stormwater runoff from VDOT-maintained roads, only 29% of VDOT respondents and 47% of county respondents stated that to be the case either often or always.

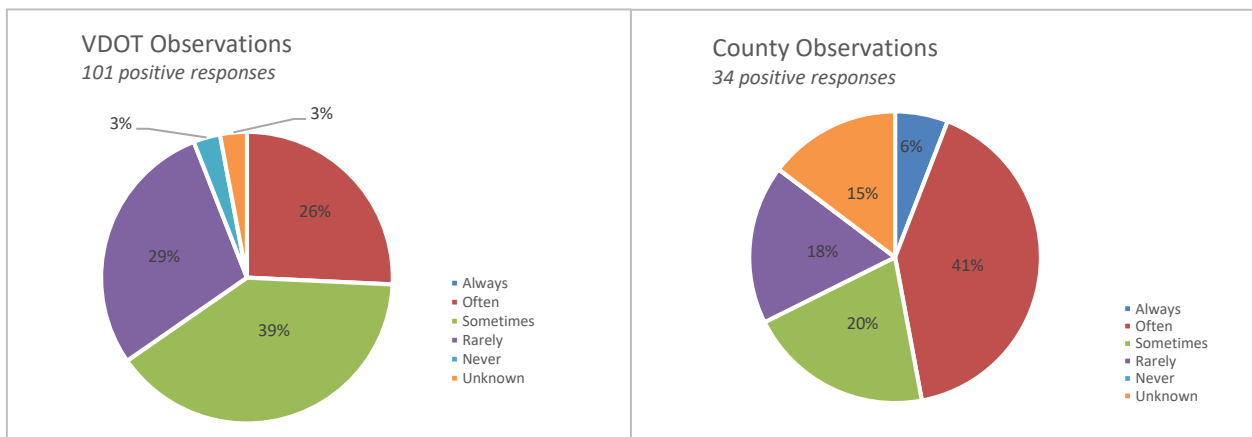


Figure 7. Responses received for the survey question: “Does the stormwater runoff flowing from outfalls without an assigned maintaining entity generally originate from VDOT-maintained roads?”

Further, while the Study is directed at an examination of outfalls originating from VDOT-maintained roads, most often such outfalls are conveying excess, off-site stormwater from beyond state rights of way. VDOT’s conveyance system is designed for and manages stormwater that originates from VDOT-maintained roadways. At times, excess stormwater originates off-site and enters VDOT-maintained roadways from private property, only to leave the system down gradient and discharge at yet another point outside of VDOT’s ownership. The excess stormwater, which both originates and discharges beyond the state-owned rights of way, need not arise from excess property development. Often this stormwater runoff is generated from the surrounding topography and reflects the natural flow of water crossing the road, the placement of which is incidental to the stormwater flow. In such instances, the roadside ditches channel the water but removal of the roadway and roadside ditches would not negate the need for the outfall. From the VDOT and county responses depicted in Figure 8, it appears that the commingling of water from multiple property owners is a contributing factor to the condition of the outfalls or the perception that the allocation of maintenance responsibilities may have shifted. Specifically, for those outfalls previously identified above in Figure 7 as having received stormwater flow from VDOT-maintained roads, 93% of VDOT respondents and 85% of County respondents responded that the VDOT-maintained roads contributing to such outfalls also sometimes, often, or always receive significant stormwater from adjoining properties.

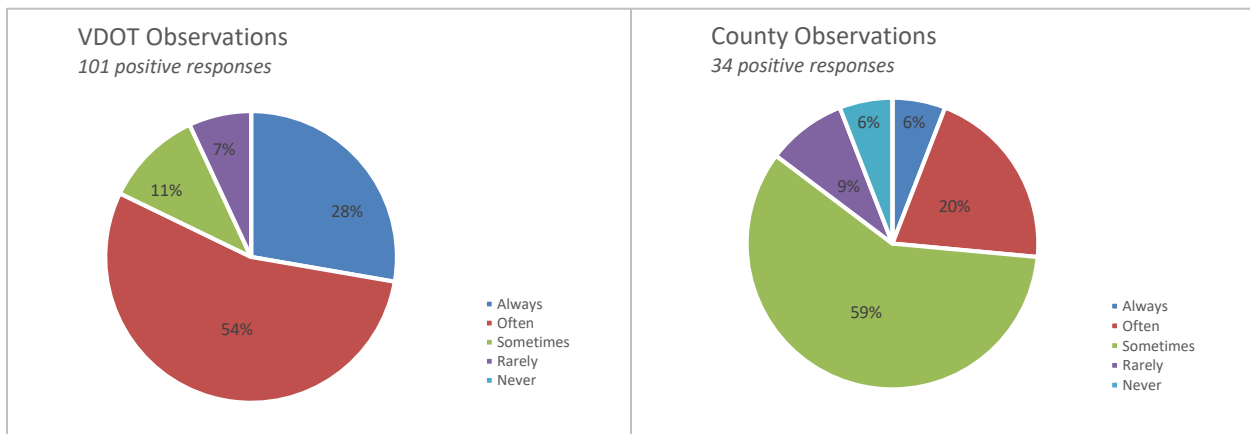


Figure 8. Responses received for the survey question: “If the stormwater runoff generally originates from VDOT-maintained roads, are the roadways at the location of the outfall generally also receiving significant stormwater from outside of VDOT rights-of-way?”

## 2. Lack of Awareness

As discussed previously, the owner of a property, or the holder of a drainage easement, has the responsibility to maintain the outfall. Nevertheless, the lack of clarity that ownership includes maintenance responsibility contributes to an increased occurrence of unmaintained outfalls. The responses depicted in Figure 6 from both VDOT and the counties demonstrate that the vast majority of the maintenance responsibilities for outfalls are being assigned to private entities when created, whether the property owner, homeowners association, or land developer. As seen in Figure 9, the resulting lack of clarity regarding allocation of maintenance responsibilities, especially

among private entities, is identified by counties as the single most significant contributing factor that prevents adequate maintenance of outfalls.

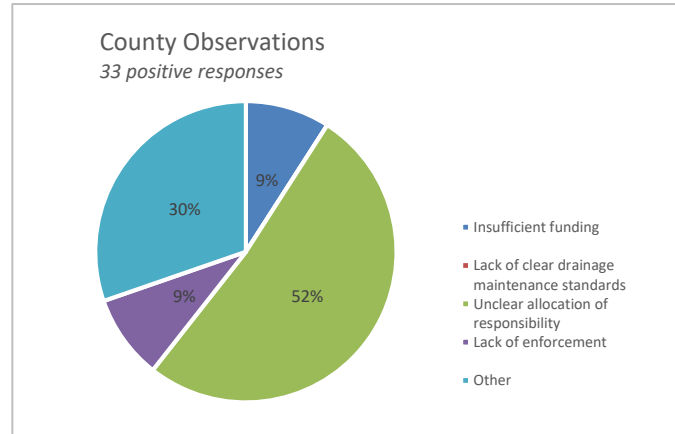


Figure 9. Responses received for the survey question: “For outfalls that have an assigned, yet inactive maintaining entity, what appears to prevent adequate maintenance of the outfall?”

### 3. Lack of Adequate Funding

The high percentage of private parties responsible for the maintenance of outfall impacts not only awareness of maintenance responsibility, but also the availability of funds. Even when an easement has been properly dedicated and the responsible party is aware of maintenance obligations, resources of private landowners and homeowners associations may not be sufficient to maintain the outfall. The distinct funding approaches taken by the various counties are depicted in Figure 10.

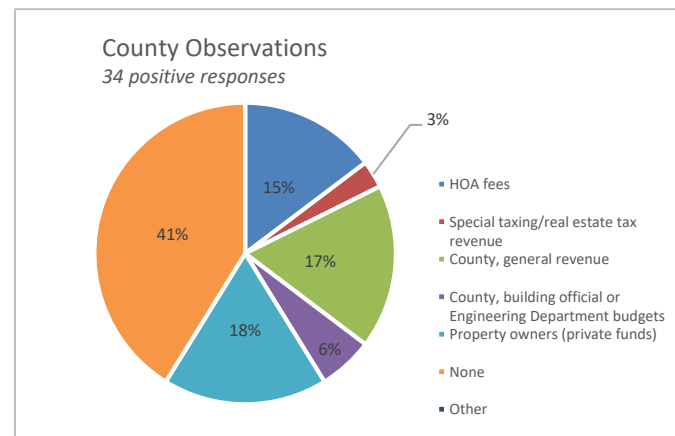


Figure 10. Responses received for the survey question: “How is the maintenance of drainage outfalls typically funded in your county?”

Where counties, in turn, feel that there is not a sufficient mechanism by which to legally enforce such corrective measures on private parties, the occurrence and severity of unmaintained outfalls will likely increase due to further degradation.

## V. Recommendations

The occurrence of unmaintained outfalls across the Commonwealth stems from several historical and practical factors. Based on the findings above, the Secretary of Transportation and the Secretary of Natural Resources, with the support of staff, are providing the following recommendations to mitigate the consequences of unmaintained outfalls.

### A. Clear Communication of Maintenance Responsibility

The most significant factor identified by both VDOT and the counties contributing to the occurrence of unmaintained outfalls is a lack of awareness by the responsible party. As discussed above, the law assigns maintenance of all outfalls with either the landowner or easement holder. A clear communication of such responsibility should be made at the time the property conveys. This approach with regards to other needs is already adopted in limited situations. Section 15.2-2242 (3) of the Code of Virginia sets forth optional provisions for subdivision ordinances and states that the ordinances may include:

*A requirement that, in the event streets in a subdivision will not be constructed to meet the standards necessary for inclusion in the secondary system of state highways or for state street maintenance moneys paid to municipalities, the subdivision plat and all approved deeds of subdivision, or similar instruments, must contain a statement advising that the streets in the subdivision do not meet state standards and will not be maintained by the Department of Transportation or the localities enacting the ordinances. Grantors of any subdivision lots to which such statement applies must include the statement on each deed of conveyance thereof. However, localities in their ordinances may establish minimum standards for construction of streets that will not be built to state standards.*

*For streets constructed or to be constructed, as provided for in this subsection, a subdivision ordinance may require that the same procedure be followed as that set forth in provision [(A)] 5 of § 15.2-2241. Further, the subdivision ordinance may provide that the developer's financial commitment shall continue until such time as the local government releases such financial commitment in accordance with provision [(A)] 11 of § 15.2-2241.*

Section 15.2-2277, which applies specifically to Franklin County, takes a similar approach:

*Franklin County may by ordinance require that the clerk of the circuit court for the county, when a division of land creates any parcels equal to or greater than five acres, notify every grantee shown on the recorded deed for such parcel (i) that any roads constructed to serve parcels of five acres or more will not be accepted by the Virginia Department of Transportation or by the county unless the roads meet applicable subdivision street standards of the Department and (ii) that neither the Department nor the county will maintain such roads until such time as the roads are brought into compliance with applicable subdivision street standards of the Department in effect at the time and without cost to funds administered by the Department or the county. The notice shall be by first-*

*class mail to the address shown on the recorded deed.*

## B. Creation of Pilot Process for the Systematic Identification of Existing Unmaintained Outfalls

While clear communication of maintenance responsibilities may serve to prevent the creation of future unmaintained outfalls, development of a systematic process to identify and categorize existing outfalls that contribute to recurrent flooding issues, attributable to a lack of maintenance, would be a necessary first step in comprehensively addressing current problems with legacy outfalls. Consequently, it is recommended that a pilot process be developed by VDOT in consultation with one of the Commonwealth's counties that have identified recurring issues attributable to unmaintained outfalls, using data from the county to first identify and create an inventory of the problematic outfalls in said county, and to select several representative outfalls for purposes of the second phase of the pilot described below.<sup>5</sup>

Once the subject outfalls have been identified and inventoried, the second phase of the pilot study could categorize the selected outfalls, on a case by case basis, by: (i) analyzing the cause of the recurrent flooding at the outfall site; (ii) determining ownership, and thus maintenance responsibility, through an appropriate land records search; and (iii) proposing enforcement mechanisms to address the lack of maintenance by responsible parties and/or otherwise develop alternative local mitigation measures. The insights gained by the pilot study could then be applied by other localities in an iterative approach to support enforcement, avoid the creation of new outfalls with unclear maintenance responsibilities.<sup>6</sup>

## C. Development of a Statewide Best Practices Guide

While some counties appear to have successfully addressed the problems with unmaintained outfalls, this is not the case for all localities. Statewide best practices, arising from those more proactive and successful counties, might be developed in collaboration between VDOT, Soil & Water Conservation Districts, DEQ, and VACo and could be used to inform various aspects of the pilot recommended herein. The statewide best practices guide could address best practices and strategies related to funding mechanisms, preventative maintenance, enforcement, determination of responsible party, and prioritization. VDOT might also assist in the development

---

<sup>5</sup> VACo suggests that any pilot study should be (i) funded by the Commonwealth and (ii) overseen by VDOT or a qualified third-party with the resources, reach, and expertise to successfully inventory and analyze the issue in the pilot county. VACo further indicated that “[i]t should be noted that many counties claim to not have adequate resources to identify all Orphan [unmaintained] Outfall locations and develop/provide title abstracts for those located within their borders.”

<sup>6</sup> While VDOT would not have the requisite expertise or resources to conduct a pilot study that would encompass all orphaned or unmaintained outfall locations in a given locality, VDOT could, in cooperation with such locality, identify key or representative outfalls that could then serve as models for the second phase of the pilot. To the extent that the outfalls selected for the second phase of the pilot can be limited to a reasonable number, VDOT would utilize staff or providing funding necessary to compensate third party sources for purposes of completing the second phase of the pilot.

of standard outfall retrofit designs and design standards, which could be incentivized through applicable water quality credits to address total maximum daily loads (TMDL) pollutant reduction requirements for permitted Municipal Separate Storm Sewer Systems (MS4) permittees.

VDOT's Maintenance Division reviewed practices from other states related to outfall maintenance, ditching practices, and training materials to determine if any had additional practices that could be incorporated into VDOT's work as best practices. Although informative, the review did not reveal specific items that would serve to improve or enhance VDOT's best practices. Notwithstanding, VDOT will continue to review new practices and leverage knowledge gained to make improvements to its program in the areas of outfall maintenance, ditching practices and/or training.

#### D. Adoption of Dedicated and Innovative Funding Sources

The various funding sources employed by counties depicted in Figure 10 provides a glimpse into the options available to address outfall maintenance, including both county general funds and dedicated special funds, such as stormwater utility fees and private funds such as HOA fees. A number of existing grant opportunities, such as FEMA's Hazard Mitigation Assistance Grants, which provides monies to state and local governments to rebuild in a way that reduces, or mitigates, future disaster losses, should also be explored. Further, the General Assembly may wish to consider establishing a program for outfall maintenance modeled after DEQ's Stormwater Local Assistance Fund, which provides matching grants to local governments for the planning, design, and implementation of stormwater best management practices.

All of the above strategies should be engaged to reduce both the legacy unmaintained outfalls across the Commonwealth and to reduce the occurrence of such outfalls in the future.