

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re UPSTREAM ADDICKS AND BARKER
(TEXAS) FLOOD-CONTROL RESERVOIRS

Sub-Master Docket No. 17-9001L

Judge Charles F. Lettow

THIS DOCUMENT APPLIES TO:

ALL UPSTREAM CASES

TEST PROPERTY PLAINTIFFS' POST-TRIAL REPLY BRIEF

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OVERVIEW

The Government’s Post-Trial Memorandum (hereafter “U.S. Post-Trial Brief”) argues that Tropical Storm Harvey was of such an unprecedented magnitude that Corps of Engineers was put to a no-win choice between flooding of properties Upstream or Downstream of the Addicks and Barker dams. That assertion is completely false. Harvey did not present the Government with a “zero-sum game” dilemma. To the contrary, the Corps had already determined and planned to protect the Downstream property owners at the expense of those Upstream. The Corps made no emergency decisions that were contrary to the Water Control Manual. The trial confirmed the situation that this Court previously recognized:

[T]he actions available to the government for dealing with the relevant emergency [Harvey] were constrained by the design of the dams and impoundments, the Corps’ 2012 Water Control Manual, and the Corps’ normal operating procedures. Key to those constraints was the design of the dams that contemplated flooding land outside government ownership or control. The design pools extended well beyond land owned by the government, to include thousands of homes and businesses. Thus, it was not that the government had to respond to Tropical Storm Harvey as an emergency that necessitated the flooding of private land, but rather it was the design of the dams and the government’s procedures for operating them, all put in place well before Harvey arrived.

In re Upstream Addicks and Barker (Texas) Flood-Control Reservoirs, 138 Fed. Cl. 658, 669 (2018). The essential, foundational argument of the entire Government defense to Plaintiffs’ claims is a myth.

Aside from the false “no-win” premise, the U.S. Post-Trial Brief and this record do more to prove the Test Property Plaintiffs’ case than refute it.

- The Government admits that the “government action” at the heart of Plaintiffs’ case was its use of the congressionally-authorized Buffalo Bayou and Tributaries Project (the “Project”), to hold back and control stormwater impounded by the Project which was designed, constructed, modified, and operated by the U.S. Army Corps of Engineers (the “Corps”) to protect Downstream communities.¹

¹ See U.S. Post-Trial Brief at i, 4-5. See also *In re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs*, No. 17-CV-9002L, In the United States Court of Federal Claims, United States’ Cross-Motion for Summary Judgment and Opposition to Plaintiffs’ Motion for Summary Judgment, Dkt. No. 183 at 31 (August 3, 2019) (“The ‘affirmative act’ here includes the construction of the Project in the

- The Government admits that the Corps knew its operating concept imposes flooding on private lands without benefit of a flowage easement or other legal right, which is a necessary byproduct of the undisputed fact that the Government did not purchase sufficient property behind the Addicks and Barker dams to store the amount of the stormwater runoff the Project was designed and constructed to hold back and control, but instead only purchased enough property to store stormwater runoff associated with the 1935 storm, which produced approximately 15 inches of rain in 72 hours (*i.e.*, a 25-year storm).²
- The Government admits that during Harvey the Corps operated the Project in precise accordance with the compulsory operational edicts of its Water Control Manual.³
- The Government admits that the maximum inundation experienced by each test property was caused by the proscribed operation of the Project, which holds back and controls stormwater runoff in the Project's reservoir area (including Plaintiffs' homes and businesses).⁴

1940s, as well as the closing of the gates at the onset of Hurricane Harvey") (hereafter "U.S. Downstream MSJ"). The Government affirms that the Project "has protected downstream properties spectacularly well." U.S. Post-Trial Brief at 6.

² See U.S. Post-Trial Brief at 3; *see also* PX 2293-2295 (NOAA Atlas 14, Vol. II Point Precipitation Frequency Estimates showing that 15" of rain in 3 days has a 25-year recurrence interval). What the Corps states it may have "reasonably believed" or "intended" is irrelevant to the question of whether a taking occurred. *See Ridge Line, Inc. v. United States*, 346 F.3d 1346, 1356 (Fed. Cir. 2003) (court should "determine whether the increased runoff on the claimants property was the predictable result of the government action"); *Hansen v. United States*, 65 Fed. Cl. 76, 117 (2005) ("The implication of the disjunctive [test in *Ridge Line*], of course, is that the individual sub-parts (intent *or* causation) are each sufficient grounds upon which to predicate a takings claim. Provided that one of the two sub-parts is demonstrated, there is no requirement that the other also be satisfied. Accordingly, a plaintiff can establish a takings claim by proving causation without *also* proving intent. ... The standard of 'predictability' that the Federal Circuit referred to, as part of the causation analysis to be conducted on remand, was an objective inquiry that did not implicate the subjective intent, knowledge or foresight of the government."). The Corps' evaluation, and rejection, of the option to acquire flowage easements or additional fee simple real estate illustrates the Government's knowledge of the Project's consequences, and intent to flood upstream properties given a large enough storm. Even if Plaintiffs had to show the Corps' reasonable belief, evidence in the record supports that showing too.

³ See U.S. Post-Trial Brief at 50; *see also* U.S. Downstream MSJ at 11 ("The Addicks and Barker dams and reservoirs are operated by the Corps in accordance with a Water Control Manual, dated November 2012.").

⁴ See U.S. Post-Trial Brief at ii; *see also* U.S. Downstream MSJ at 18 ("[T]he pool of floodwater behind Barker Reservoir exceeded the government-owned land behind Barker Dam on August 27, and early the following day, the pool of floodwater behind the Addicks Reservoir exceeded the government-owned land behind Addicks Dam."); *see also* 9 R.R. 2777:1-6; 20-23 (Nairn); *see also* DX 608, Expert Report of Dr. Robert Nairn at iii ("With the federal project in place, peak flood elevations at all the upstream Test Properties are attributed to backwater due to high pool elevations in Addicks or Barker Reservoirs . . ."); *id.* at 94 ("Peak flood elevations at all the upstream Test Properties are attributed to

- The Government admits that each Test Property Plaintiff held a property interest that was damaged or destroyed by the Government's impounded stormwater runoff.⁵

These facts, all admitted by the Government, proves the Government's liability.

The Government has always known its operating concept would impose flooding on Upstream private lands within the Project's design pools in order to achieve its stated public purpose of reducing downstream flood damages. During and after Harvey, that inevitable and long-predicted occurred. The overwhelming evidence and testimony of the pertinent narrative in this case proves that (a) the Government designed, built, and operated its federal flood-control Project; (b) knew the foreseen and intended consequences of the design, construction, and operations of the Project; (c)

backwater due to high pool elevations in Addicks or Barker Reservoirs.”). As the United States has acknowledged to this Court, “Proof of causation in a flooding case requires plaintiffs to show that their properties experienced more flooding than they would have absent government action addressing the relative risk.” U.S. Downstream MSJ at 23.

The Government's misleading use of nomenclature must be highlighted here. The Government continually attempts to characterize the “reservoirs” behind each dam as coterminous with the government-owned land behind those dams. That is false. The “reservoir” is the area necessary to hold the amount of runoff which each dam is designed to retain—regardless of whether the government acquires the necessary property interests to use that property for its public purpose. See EM 1110-2-1420, at 2-1 (stating that a “reservoir, as defined by ER 1110-2-1156, Engineering and Design Safety of Dams, is a body of water impounded by a dam in which water can be stored. Congressionally authorized purposes of reservoirs in the USACE include flood risk management”) (https://www.publications.usace.army.mil/Portals/76/Users/182/86/2486/EM_1110-2-1420.pdf?ver=2018-11-29-122500-613) (last accessed September 6, 2019).

⁵ U.S. Post-Trial Brief at 111 (noting Banker ownership of test property); *id.* at 115 (same for Burnham); *id.* at 121 (same for Giron); *id.* at 126 (noting Holland leasehold interest in test property); *id.* at 129 (noting Lakes on Eldridge ownership of test property); *id.* at 131 (same for Micu); *id.* at 135 (same for Popovici); *id.* at 139 (same for Sidhu); *id.* at 142 (same for Soares); *id.* at 146 (same for Stewart); *id.* at 149 (same for Turney); *id.* at 154 (same for Wind); *id.* at 156 (same for West Houston Airport Corporation). The Government's admission that the Test Property Plaintiffs owned an interest in the property inundated by the reservoir pools is all that is required for a finding of liability; its argument that the damage the government action caused could be repaired—or that the Government provided post-taking aid to its victims—is completely irrelevant to the question of liability. See *First English Evangelical Lutheran Church of Glendale v. Los Angeles Cty., Cal.*, 482 U.S. 304, 321 (1987) (holding that “where the government's activities have already worked a taking of all use of property, no subsequent action by the government can relieve it of the duty to provide compensation for the period during which the taking was effective”).

repeatedly recognized the Project's inevitable flooding of upstream private property; and (d) nevertheless still took every action both before and during Harvey to protect downstream interests at the expense of Upstream landowners.

The Government's promotion of legal theories that have been repeatedly rejected by this and other Courts, and its reliance on an unsupported factual narrative, cannot shield it from its categorical constitutional obligation to compensate these Test Plaintiffs for bearing the burden of protecting downstream Houston and the Houston Ship Channel from the devastating effects of Harvey's stormwater runoff racing unabated down Buffalo Bayou.

ARGUMENT IN REPLY

I. THE "FACTUAL EVIDENCE" PORTION OF THE GOVERNMENT'S POST-TRIAL MEMORANDUM PROVIDES LITTLE "EVIDENCE" THAT IS RELEVANT TO THE LIABILITY DETERMINATION IN THIS MATTER.

The Government's brief provides a false narrative, full of contradictions but lacking any valid counter to Plaintiffs' claims. For example, the Government argues that Harvey was an unprecedented event and implies that it was unforeseeable to the Government, while simultaneously asserting that all the Test Property Plaintiffs "knew or should have known" about Upstream pool flooding years before Harvey. The two themes cannot both be true. Indeed, neither is. Similarly, the Government argues it had to make "zero-sum game" decisions in real time but admits, as it must, that the Corps followed the mandatory directives of its 2012 Water Control Manual to the letter when operating the dams. And, while the Government tries to exculpate itself for storing the stormwater runoff its Project was constructed to retain by claiming Harvey dumped an unprecedented volume of rainfall, the Government, at the same time, admits that the Upstream properties would have flooded if recent storms, such as Tropical Storms Allison and Claudette, had been centered over the Buffalo Bayou watersheds.

As described below, much of the Government's factual argument is legally irrelevant to these physical takings claims. Still, even the irrelevant facts the Government chooses to trumpet cannot

drown out those it chooses to ignore. The Upstream Plaintiffs have established a record upon which this Court can and should find liability against the United States for taking private property.

A. The Government Designed the Dams to Store Even More Stormwater Runoff than Resulted from Harvey—A Storm the Government Admits will Likely Re-occur.

The Government argues that because of the “unprecedented” nature of Harvey, the damage to Plaintiffs’ real and personal property was not the “direct, natural and probable result” of government action.⁶ As the trial record demonstrates, the Government’s attempt to place the blame for Project-induced flooding on the “unique” nature of the Harvey storm ignores several obvious counterargument and contradicts decades of its own observations and admissions.

1. Upstream Project-induced flooding was and is “the direct, natural and probable” result of the Project’s intended use and operation.

Initially, the relevant inquiry does not ask whether Harvey can be characterized as “unprecedented” or not, but instead whether the Government’s invasion was the direct, natural, or probably result of an authorized activity, *St. Bernard Par. Gov’t v. United States*, 887 F.3d 1354, 1360 (Fed. Cir. 2018), *cert. denied*, 139 S. Ct. 796 (2019); and relatedly whether the authorized use and intended operation of the Project directly or foreseeably resulted in the occupation and invasion of the Upstream private properties with impounded stormwater runoff, *Arkansas Game & Fish Comm’n v. United States*, 568 U.S. 23, 39 (2012).

It did. Witnesses at trial confirmed that Addicks and Barker hold back and control stormwater runoff from the hundreds of square miles comprising the Upper Buffalo Bayou watershed in order to effectuate the Project’s purpose of protecting the City of Houston from damaging flood stages.⁷ The

⁶ See U.S. Post-Trial Brief at i, 46, 82; see also 1 R.R. 35:24-36:3.

⁷ 1 R.R. 81:19-82:16.

source of the stormwater runoff is rain that is not absorbed in the ground. The dams function hydrologically by holding back this stormwater into the resultant reservoir flood pools.⁸

The Government originally designed the Addicks and Barker dams to impound more than the amount of rainfall runoff produced by Harvey. The Design Storm used by the Government in the 1940s for the Addicks and Barker dams and reservoirs was the 1899 storm over Hearne, Texas, a storm that dumped 32-35 inches in 3-4 days.⁹ As the Government's expert meteorologist testified, the amount of rainfall over the Addicks and Barker Watersheds during Harvey was about 31 inches over three to four days—precisely the amount of rainfall the Government originally designed the Project to retain.¹⁰

Even at the time of design and construction, the Government acknowledged that this amount of rain would be expected to occur during the life of the Project—an expected frequency within about 50 years.¹¹ Indeed, during the 70 years prior to Harvey, the relevant geographic region¹² saw even more

⁸ 1 R.R. 90: 17-20; 1 R.R. 174:15-175:14; 7 R.R. 1936:1-3.

⁹ JX 5, Buffalo Bayou, Texas Definite Project Report (June 1, 1940, USACE 129508-09) (stating that the Corps' December 13, 1938 Special Hydrology Report concluded that there was no evident meteorological reason why the Hearne storm could not have centered over the basin); *id* at USACE 129527 (discussing the “design storm rainfall of 31.4 inches”); PX 87, Buffalo Bayou and Tributaries, Texas Addicks and Barker Dams, Environmental Assessment: Dam Safety § 5.04 (November 1981, USACE 012906) (discussing the adopted spillway design flood as based on the 1899 Hearne storm of 30 inches in 72 hours); DX 25, Reservoir Regulation Manual (August 1955, USACE 284642) (Corps investigated 52 storms in central and coastal Texas to establish Design Storm).

¹⁰ U.S. Post-Trial Brief at 59; 5 R.R. 1161:20-1162:5 (Kappel).

¹¹ Plaintiffs are moving to admit certain ancient documents that were produced post-trial by the Government, one of which is ECF No 245-1, Report on Review of Plans for Buffalo Bayou Flood Control by the War Department United States Engineer Office, Galveston, Texas (dated April 6, 1938) at USACE2019_000014 (stating that 35.1 inches in 104 hours is likely to occur with a frequency of once every 50 years).

¹² PX 707, Standard Project Flood Determination (March 1, 1965, USACE 000497) (defining “region” to include area surrounding the given basin in which the storm producing factors are substantially comparable); 4 R.R. 1026:18-1027:10.

rainfall amounts during Tropical Storms Allison and Claudette.¹³ Further, one of the recently-produced historical documents from 1938 demonstrate the Corps' long-standing view that "estimated rainfall of 35.1 inches in 104 hours...does not seem unduly high" when one considers that "such a rainfall is considered as likely to occur with a frequency of once every 50 years."¹⁴

Likewise when the Government undertook substantial Project modification work on the two dams in the 1980s, it did so in recognition of the increased rainfall amounts that it expected would occur over the pertinent watersheds based on the estimated Probable Maximum Precipitation (PMP).¹⁵ As explained by the Government's chief witness Mr. Robert Thomas, the PMP is the heaviest rainfall that engineers believe could be generated by meteorological conditions in the region.¹⁶ The PMP for this federal project averages 43 or 44 inches in 72 hours which, as Mr. Thomas conceded at trial, is far greater than the 31 inches in rainfall produced by Harvey.¹⁷

¹³ PX 1597 (Corps PowerPoint) (showing what would have happened in the Addicks and Barker watershed had Tropic Storms Allison or Claudette hit there); JX 31, Memo: Consideration of Alternatives for preserving Integrity of Addicks & Barker Reservoirs Embankments (February 13, 1984, USACE 487626) (comparing the Claudette rainfall event); 5 R.R. 1199:13-1200:7 (Allison rainfall exceeded Harvey rainfall); PX 59, Draft Operational Assessment of the Addicks and Barker Reservoirs, Fort Bend and Harris Counties, TX (October 2009, USACE 464073) (Claudette dropped 43 inches of rain in Alvin, Texas, located 50 miles southeast of the Project).

¹⁴ See Ex. A to Plaintiffs' Motion to Reopen Trial Record (ECF No. 245-1), Report on Review of Plans for Proposed Buffalo Bayou Flood Control (April 6, 1938, USACE2019_0000014).

¹⁵ PX 51, Dam Safety Assurance, General Design Memorandum (June 1984, USACE 013592) (recognizing that there is a Spillway Design Storm rainfall that is based on the Probable Maximum Precipitation); 2 R.R. 497:22-498:3 (Thomas); 1 R.R. 175:15-176:7 (Thomas); PX 87, Buffalo Bayou and Tributaries, Texas Addicks and Barker Dams, Environmental Assessment: Dam Safety § 5.04 (November 1981, USACE 012898)(stating that the recorded occurrences of larger storms have resulted in significant changes in design criteria for dams and reservoirs, particularly in urban areas).

¹⁶ 1 R.R. 175:15-22; DX 255, Appendix 11 Engineering (May 2013, USACE 065023); PX 707, Standard Project Flood Determination (March 1, 1965, USACE 000497) (defining "region" to include area surrounding the given basin in which the storm producing factors are substantially comparable); 4 R.R. 1026:18-1027:10.

¹⁷ 1 R.R. 176:4-11.

Mr. Thomas also confirmed that, during Harvey, the elevation of the Project's flood pools were lower than the elevation of the main embankments or the auxiliary spillways.¹⁸ Thus, even the rainfall and stormwater runoff—and the reservoir pools created behind each dam—were not the maximum amounts the Project was designed and constructed to hold back, control, and impound. There are future Harveys, and future expropriations of properties even further upstream of the dams within these reservoirs, yet to come.¹⁹

Contrary to the Government's argument then, the Project was hardly a mere “consequential” factor in causing the flooding of the Upstream Test Properties.²⁰ The facts demonstrate that the reservoir pools during Harvey were very much the “direct” result of the intended use and operation of the Project, and accordingly were the legal cause of the flooding.²¹ This is hardly surprising -- the Project's purpose is to hold back stormwater runoff (*i.e.*, rain water that cannot be absorbed in the ground) from the several hundred square miles of watershed that is subject to frequent and massive rain storms.

The record thus renders this case as far different from those relied on by the Government which involved only “consequential” or “incidental” government action such as *Cary v. United States*, 552 F.3d 1373 (Fed. Cir. 2009). In *Cary*, plaintiffs alleged the government “took” their private property when a forest fire broke out on the national forest and spread to plaintiffs' lands. But the fire was

¹⁸ 4 R.R. 995:10-24.

¹⁹ 5. R.R. 1198:4-8; JX 118, Water Elevation Impact Tables (May 22, 2014, USACE 019883-86) (Project's Spillway Design Flood would occupy and invade over 20,000 acres of private land).

²⁰ U.S. Post-Trial Brief at 82.

²¹ See JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015301) (App'x V) (stating “in these [upstream] cases, it is clear that the dam caused the impounded floodwaters”).

actually started by a lost hunter, and the fact that the Government may have allowed fire-prone vegetation to accumulate on federal land could not constitute the “direct” cause of plaintiffs’ injury, according the court. 552 F.3d at 1378 (holding that “clearly, the government did not intend to take the landowners’ land by use of an uncontrolled wildfire”). The building of dams is entirely different since, as stated, the direct and intended hydrologic consequence of constructing flood-control dams like Addicks and Barker is the impoundment and storage of stormwater behind it.

2. Harvey’s “unprecedented” rain was anticipated, expected, and foreseen.

Additionally, the Government’s assertion that Harvey was “unprecedented” ignores the fact that the relevant legal inquiry is simply whether the flooding was a foreseeable result of the government action at issue. *Arkansas Game & Fish Com’n*, 568 U.S. at 39; *Ridge Line*, 346 F.3d at 1355 (“property loss compensable as a taking” results when “the asserted invasion is the direct, natural, or probable result of an authorized activity”); *accord Ideker Farms, Inc. v. United States*, 136 Fed. Cl. 654, 675 (2018), *reconsideration denied*, 142 Fed. Cl. 222 (2019) (defining the foreseeability standard in takings cases). Looking to the “foreseeability” of Harvey is not the question at all; instead, the question is the foreseeability of the occupation and use of these Test Properties by the stormwater runoff from the huge watersheds that is held back and controlled by the Government’s design, construction, and operation of the Addicks and Barker dams.²²

²² PX 777, Analysis of Design (September 1945, USACE 010324) (noting that in the preparation of the Definite Project Report, the Government determined that “the entire watershed above the confluence of South Mayde Creek and Buffalo Bayou must be controlled...”); PX 1213, Internal Corps Memo (June 32, 1992, USACE 322368) (stating that “Probable Maximum Flood” elevation would reach 1181.1 NGVD in Addicks and 110.3 in Barker, and “that in this scenario non-government owned land would be under water.”).

The overwhelming evidence of foreseeability (as discussed at length in Plaintiffs' Opening Post-Trial Brief²³), proves that the Government has long known that the storage capacity of the Addicks and Barker reservoirs extends well beyond the Government-owned land behind each dam.²⁴ As noted, according to the Government's expert, the amount of rain that fell over the Addicks and Barker Watersheds during Harvey was about 31 inches in 3-4 days—well within the design parameters of the reservoirs.²⁵ Harvey clearly did not exceed the Project's design capacity as August 30, 2017

²³ See Plaintiffs' Opening Post-Trial Brief, ECF No. 235, at 13-24; 111-14.

²⁴ 6 R.R. 1461:1-6 (Long); 2 R.R. 365:7-25 (Thomas). In addition to the admissions of the Government's witnesses, its own documentary evidence demonstrating foreseeability is equally devastating to the Government's case; just a few examples are repeated here. In the 1980s, the Government calculated an updated 'taking line' for the upstream area—a line indicating the area the Corps needed to acquire to comply with updated hydrologic criteria. 1 R.R. 294:1-14; 295:2-10 (Thomas); PX 46 at USACE 474375. For the Addicks and Barker reservoirs, that takings line was above the Harvey flood pool. *Id.* As one Government document stated: "the Government does not have title or easements on the land above 108.0 m.s.l. ... development of the area will eventually place the Government in the position of having to flood the area within the reservoir with the accompanying damages in order to protect downstream improvements in the event of a severe future storm." PX 39, Buffalo Bayou & Tributaries Inspection Report No. 2 (October 29, 1974, USACE 233674); *see also* JX 31, Internal Corps Memo (1984, USACE 487626) ("Projected Maximum Flood on empty pool is considered a probable occurrence when compared with the 1979 Claudette rainfall event"); PX 1597 at 31 (Corps Power-Point) ("Fact: Addicks & Barker Reservoirs are capable of putting development above the reservoir under water...storms have occurred near our area that would have caused flooding off government owned land in Addicks & Barker Reservoirs."); *see also id.* at 48 ("Addicks & Barker Reservoirs has never flooded off government-owned land. After seeing the potential for flooding from the two storms presented [Tropical Storm Claudette and Allison], we know it can and probably will happen at some point in time.").

Moreover, in the 2000s, the Corps collected first floor elevation surveys for over 10,000 structures in the area that it knew were subject to being submerged by impounded runoff. 1 R.R. 100:11-16 (Thomas). Thus, not only did the Government know upstream properties would be flooded by its operation of the Project, it knew the specific properties that would suffer from those operations. 1 R.R. 100:8-10, 170:19-25 (Thomas); 1 R.R. 273:3-7 (Thomas: "we had data indicating the first level elevations of those homes and information about the pool level").

²⁵ 5 R.R. 1161:20-1162:5 (Kappel).

reservoir flood pools were only ~45% of the reservoir's total storage capacity.²⁶ Thus, the Project held back and controlled Harvey's rainfall runoff by its very "design and intent,"²⁷ which, even in 1938, anticipated, expected, and foresaw Harvey's rainfall and runoff. Accordingly, the record forecloses the Government's purported "unprecedented" defense.²⁸ If anything, the only thing in this case that was "unprecedented" was the Government's decision to acquire neither a flowage easement nor fee simple title for sufficient Upstream property.²⁹

Were that not sufficient to eliminate the entire thrust of the Government's defense in this case, in light of the Government's required water control regulations for this Project, a single large storm is not required to cause the submersion of Upstream properties. As the Corps recognized in its 1992 *Special Report on Flooding*, the Addicks and Barker pools had reached new record levels without a single large storm event. Rather, the record pools were formed by what is known as the "ratcheting effect"—the filling of the pools by several small storms because of the Government's mandatory policy of using and operating the Project to only provide downstream flood mitigation benefits.³⁰ The

²⁶ JX 118, Water Elevation Impact Tables (May 22, 2014, USACE 019883-86)(Project flood pools associated with high point of dam elevation would occupy 851,896 acre-feet compared to the 389,300 acre-feet resulting from impoundment of Harvey's stormwater runoff).

²⁷ 6 R.R. 1454: 16-19 (Long); *see also* Plaintiffs' Opening Post-Trial Brief, ECF No. 235, at 4 (quoting Long video in which he admits the dams were designed to hold as much water as fell during Harvey).

²⁸ The evidence of foreseeability is so strong that the Government's documents even show it analyzed its litigation risk for the anticipated flooding. JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015140, USACE 015301). As explained in Plaintiffs' Opening Post-Trial Brief, the evidence that for nearly 40 years the Government repeatedly considered using its condemnation power to acquire upstream private land is indisputable evidence that the Government knew its causal role in flooding upstream properties and could foresee that flooding would one day occur from the operation of the Addicks and Barker dams. Plaintiff's Opening Post-Trial Brief, ECF No. 235, at 110 & n. 522.

²⁹ 4 R.R. 1011:14-1012:9; 4 R.R. 1032:15-1033:2 (confirming that, at the Lewisville dam, the flowage easement elevation was actually above the uncontrolled spillway elevation); PX 3000.

³⁰ 2 R.R. 363:11-364:11; JX 44, *Special Report on Flooding* (March 1992, USACE 015070).

Corps cannot change that policy without authorization from Congress that alters the designated public purpose of the Project.³¹ Thus, as Dr. Bedient concluded, “the design, construction, and operation of the dams, flooding of upstream private property is inevitable to re-occur. The dams are permanent, immovable structures. As part of their purpose, they are operated to capture and impound rainfall runoff in the Addicks and Barker watersheds when heavy rains come to the greater Houston area. The upstream properties are located within the intended reservoir pools of the Addicks and Barker dams.”³² The Government’s characterization of Harvey as “unprecedented” is therefore both legally irrelevant and factually wrong.

B. The Government’s Emphasis on its Knowledge During the Design in the 1940s, and Argument that the Foreseeability Inquiry should Run from 70 Years Ago, is Undercut by the Continuous Governmental Management and Operation—*The Retention of Stormwater Runoff*—of the Federal Project.

The Government asserts that the foreseeability analysis is limited to when the dams were constructed in the 1940s.³³ Legally, however, this new argument falls apart; and factually the record debunks this fictitious narrative. As but one example, the record is replete with references to the how the Corp modified the Project and its operations since the 1940s, and how these modifications, in turn, produced higher reservoir flood pools.³⁴

³¹ 2 R.R. 428:23-429:12.

³² PX 526, Expert Report of Dr. Philip Bedient at 57 (November 5, 2018).

³³ U.S. Post-Trial Brief at 79. Significantly, the Government’s position here is squarely at odds with its position in the Downstream case, in which the Government argues that “the entirety of the Government’s action” is the relevant inquiry. U.S. Downstream MSJ at 25.

³⁴ PX 39, Memo: Inspection Report No. 2 (October 29, 1974, USACE 233672); JX 44, Special Report on Flooding (May 1992, USACE 015077) (summarizing changed operations to protect downstream interests by utilizing, to the maximum extent possible, available storage capacity in the reservoirs); JX 85, Draft Public Information Notice (October 23, 1980, USACE 543333) (discussing “compromised operation” associated with Buffalo Bayou’s limited conveyance capacity).

First, a legal foreseeability inquiry is not static at a single point in time, particularly when the government project is operated over a significant period of time. Critically, the opening and closing of the Project's gated outlets was not the sole aspect of the Project's operation—indeed, as the Government freely admits, the Project's twenty-five (25) miles of embankments accomplish their planned purpose by holding back and controlling Harvey's stormwater runoff.³⁵ Thus the *Arkansas Game* opinion is inapposite to the Government's position since it was the cumulative nature of the observations *over time* which the courts have examined when determining the foreseeability of flooding during any single release. *See, e.g., Arkansas Game & Fish Comm'n v. United States*, 736 F.3d 1364, 1373 (Fed. Cir. 2013) (addressing foreseeability and running the inquiry, not from the dam's construction in the 1940s, but from the 1990s when the deviations in the water control plan started).

The cases cited by the Government do not change this fact. The Supreme Court in *John Horstmann Co. v. United States*, 257 U.S. 138 (1921) explained that “the controversy of the cases turns upon the condition of the lakes at that time [1906], and their condition after an irrigation project was instituted by the government, called the Truckee Carson project.” 257 U.S. at 142 (emphasis added). Contrary to the Government's assertions, *Horstmann* does not stand for the proposition that foreseeability is limited to the period of the Project's construction.

The Government also erroneously relies on the cases of *Moden v. United States*, 404 F.3d 1335, 1345 (Fed. Cir. 2005) and *Cary v. United States*, 552 F.3d 1373 (Fed. Cir. 2009). However, neither of these cases support the proposition that the relevant foreseeability point is limited to the Project's construction in the 1940s either. In *Moden*, the Federal Circuit affirmed the dismissal of the plaintiffs' case when there was insufficient evidence that the Government could have foreseen that its use of

³⁵ 1 R.R. 83:7-10 (Thomas testimony admitting that gated conduits are a small fraction of the total length of embankments used to hold back runoff).

chemical solvents to degrease airplane might contaminate groundwater by migrating through previously undetected “paleochannels,” which caused contamination of the groundwater under plaintiffs’ specific properties. *See Moden v. United States*, 60 Fed. Cl. 275, 278 (2004). In *Cary* the court specifically distinguished flood cases after noting that the causal actor for the wildfire fire was a lost hunter, as opposed to dams used in a Government flood-control Project. 552 F.3d at 1378. Indeed, try as it might the Government cannot refute the fact that the direct and intended hydrologic consequence of its Project entails the holding back and control of impounded stormwater runoff in resultant reservoir pools.

Thus, none of the cases relied on by the Government support the proposition that the relevant foreseeability point in the takings analysis is limited to the Project’s construction in the 1940s. As conditions and criteria changed, the Government adjusted its design, construction and operation of its Project accordingly. Therefore, limiting the temporal inquiry in this case would require ignoring the Corps’ ongoing Project review, as well as the physical and operational modifications to the Project over time.

Second, the record here actually proves that the Government could (and did) foresee at the time of construction in the 1940s that its flood-control project could inundate Upstream properties with retained stormwater runoff. The Government originally designed the Addicks and Barker dams in the 1940s to retain and store a volume of stormwater runoff in amounts comparable to Harvey’s.³⁶ Even in the 1940s, the Government knew a “design storm” event, which would result in reservoir

³⁶ JX 5, Buffalo Bayou, Texas Definite Project Report (June 1, 1940, USACE 129527) (discussing the “design storm rainfall of 31.4 inches”); PX 87, Buffalo Bayou and Tributaries, Texas Addicks and Barker Dams, Environmental Assessment: Dam Safety § 5.04 (November 1981, USACE 012906) (discussing the adopted spillway design flood as based on the 1899 Hearne storm of 30 inches in 72 hours).). As the Government’s witness admitted, the amount of rain that fell over the Addicks and Barker Watersheds during Harvey was less than that of the 1899 Hearne storm used by the Government when it designed the Project. 5 R.R. 1161:20-1162:5 (Kappel estimated Harvey rainfall at an average 31 inches over the Addicks and Barker watersheds).

pools on private lands, was likely to occur during the life of the Project.³⁷ Indeed, as stated, a recently-produced 1938 report reveals the Government predicted storms of Harvey’s magnitude (*i.e.*, ~35 inches of rainfall in ~100 hours) were “likely to occur with a frequency of once every 50 years” and that 30” of rain in 72 hours is “believed likely to occur once each 14 years.”³⁸ Thus, the Government had more than adequate knowledge in the 1940s when the dams were constructed that the real property within the design reservoirs would be submerged by the original formulation of the Project.³⁹

And **third**, despite to the Government’s attempt to limit the foreseeability inquiry to the 1940s, the record shows that the Government did not only act in the 1940s, but has undertaken continued actions, oversight, review, management, and operation of the Project from the time they were constructed up to the present day—acting at every turn to protect Downstream Houston properties at the expense of Upstream inundation. In the intervening years since their construction, the Corps reviewed and updated the relevant hydrology;⁴⁰ made modifications to the dams including raising the embankment;⁴¹ and re-evaluated dam safety risks in light of anticipated runoff volumes.⁴²

³⁷ JX 5, Buffalo Bayou, Texas Definite Project Report (June 1, 1940, USACE 129508-09 (stating that the Corps’ December 13, 1938 Special Hydrology Report concluded that there was no evident meteorological reason why the Hearne storm could not have centered over the basin); JX 15, Report on the Feasibility of Gating the Uncontrolled Conduits (June 30, 1960, USACE 0000397) (maximum design water surface elevation–5.8’ beyond Government-owned land–determined by centering transposed Hearne storm over pertinent watersheds).

³⁸ See Ex. A to Plaintiffs’ Motion to Reopen Trial Record (ECF No. 245-1), Report on Review of Plans for Proposed Buffalo Bayou Flood Control (April 6, 1938, USACE2019_0000014).

³⁹ JX 7, Drawings to Accompany Definite Project Report (June 1, 1940, USACE010219)(Addicks and Barker Reservoir map showing that the original Project design would occupy and invade private lands with the reservoir pools resulting from the Design Storm.)

⁴⁰ 2 R.R. 497:16-21 (Thomas).

⁴¹ 1 R.R. 127: 10-22; 2 R.R. 486:15-487:2 (Thomas).

⁴² *E.g.*, PX 38, Memo: Buffalo Bayou and Tributaries, Barker Dam, Texas, Inspection Report No. 2 (August 6, 1974); 1 R.R. 244:16- 245 (Thomas); 1 R.R. 308: 1-8 (discussing PX 85, Public Information Notice: Buffalo Bayou and Tributaries, Texas – Addicks and Barker Dams (October 23, 1980)); JX 52

Indeed, the Government's Project modification work in the 1980s followed the Government's recognition that the Projected Maximum Flood "on an empty pool is considered a probable occurrence when compared with the 1979 Claudette rainfall event which occurred some 40 miles south of the reservoirs."⁴³ As a "secondary" design and construction event, there is no valid basis to exclude the knowledge of the Government at that time from the foreseeability question, and the record shows that the Government knew that the dams as now modified would *still* inundate these properties given a Probable Maximum Precipitation event.⁴⁴

Hollow too is the Government's allegation that the Corp did "enough" through land acquisition in the 1940s,⁴⁵ which was rationalized on the basis that "the savings in annual interest would be in excess of the probable damages from storms producing pools greater than the takings line."⁴⁶ For instance, when the Government points to the 1935 storm as the most intense storm during that era,⁴⁷ this observation ignores the original design parameters from the 1899 Hearne Design Storm as well as the hydrologic reevaluation reflected by the 1977 Hydrology Report. As Mr. Thomas conceded, Claudette and the 1977 Hydrology Report changed things dramatically for the Corps by setting the

Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015131).

⁴³ JX 31, Memo: Consideration of Alternatives for preserving Integrity of Addicks & Barker Reservoirs Embankments at 2 (February 13, 1984, USACE 487626) ("Projected Maximum Flood on empty pool is considered a probable occurrence when compared with the 1979 Claudette rainfall event");

⁴⁴ 1 R.R. 175:15-22; 1 R.R. 176:4-11.

⁴⁵ U.S. Post-Trial Brief at 11

⁴⁶ JX 5, Buffalo Bayou, Texas Definite Project Report (June 1, 1940, USACE 1229527-58).

⁴⁷ U.S. Post-Trial Brief at 9. Plaintiffs note that the Corps' own documents do not limit design storms to specific watersheds. *See* PX 707, Standard Project Flood Determination (March 1, 1965, USACE 000497) (defining "region" to include area surrounding the given basin in which the storm producing factors are substantially comparable); 2 R.R. 464:13-465:4.

PMP to 44.6 inches in 72 hours.⁴⁸ Because of that 1977 report, as Mr. Thomas explained, the Corps had to make substantial modifications to the dams so that they could contain the Spillway Design Flood,⁴⁹ and the Government's Post-Trial Memorandum concedes that the Corps "entered into a renewed period of analysis to evaluate safety concerns to downstream properties and the related flooding concern to upstream properties."⁵⁰ Still even in the face of the updated hydrologic criteria, when the Corps evaluated additional land acquisition that would have foreclosed the widespread development of the upstream area, it affirmatively decided to reject the option in order to save money.⁵¹

Finally, the Government's argument to narrow the foreseeability inquiry to only the probability of a storm like Harvey occurring in the 1940s, is undercut by the Corps' own documents actively predicting what would happen if more recent storms like Claudette or Allison had occurred over the Addicks and Barker watersheds.⁵² The Corps itself has been predicting the possibility of a Harvey-like

⁴⁸ 1 R.R. 256:15-18; 2 R.R. 497:16-21.

⁴⁹ 1 R.R. 257:21-258:1.

⁵⁰ U.S. Post-Trial Brief at 19.

⁵¹ *E.g.*, 1 R.R. 289:5-21 (1980s decision not to purchase 8,700 acres); PX 48, Memo: Rehabilitation of Addicks and Barker Dams (September 9, 1980, USACE 543358) (document showing the OCE is in agreement that upstream real estate should be purchased, but this never happened); Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas at 2 (October 1995, USACE) (Recon study where no action alternative was selected).

As Plaintiffs have stated previously, Plaintiffs' position is not that the Government's failure to acquire additional land behind the dams upon which to store stormwater runoff is the "governmental action" which constitutes the taking in this case. Rather, the evidence adduced confirms the knowledge and intent of the Government to use private property to fulfill the Project's public purpose from the first day construction of the dams was completed. *See Arkansas Game & Fish Comm'n v. United States*, 736 F.3d 1364, 1372-73 (Fed. Cir. 2013) (opinion after remand) (foreseeability encompasses both what the Corps knew at the time it built the Dams as well as what it could have foreseen would be the consequences of its actions). Because the Government continually acknowledges the lack of sufficient property to store its impounded stormwater runoff, the "intent" of the government sufficient to prove a taking could not be stronger in this case.

⁵² *E.g.*, PX 1597 (Corps PowerPoint).

event for years. Even the Governments’ brief concedes that as early as the 1970s, “the Corps [became] aware in the 1970s that a real possibility existed of a large storm creating flood pools at the reservoirs that could extend into the new developments upstream of the GOL boundaries.”⁵³ Against these concessions, it is difficult to take seriously the Government’s argument that foreseeability should stem only from what it knew in the 1940s especially when its actual knowledge in that time period cannot be reconciled with the Government’s portrayal.

C. There was no “Zero Sum Game” during Harvey because the Government had no Discretion to Decide how to Operate the Dams.

The Government argues that during Harvey, it faced a “zero-sum game” dilemma because it could not avoid flooding both Upstream and Downstream properties.⁵⁴ Apparently the Government misunderstands the term,⁵⁵ as well as the interests served by the Project’s authorized purpose.

The Government portrays the zero-sum game here as being forced to decide whether and when to open or close the dams’ outlet gates because opening the gates earlier would slightly reduce flooding Upstream but increase flooding Downstream, and keeping the gates closed would increase flooding Upstream.⁵⁶ The Government’s pretense is this was a decision it was forced to confront. It was not.

First, the Government had no discretion to decide between flooding the Upstream versus flooding the Downstream properties. As the Government’s witness, Robert Thomas confirmed, the

⁵³ U.S. Post-Trial Brief at 18.

⁵⁴ U.S. Post-Trial Brief at 51–52; 1 R.R. at 34:12–19 (Counsel opening statement).

⁵⁵ A zero-sum game—derived from game theory—describes a “situation in which a gain for one side necessarily entails an equal and opposite loss on the other side.” Black’s Law Dictionary (11th ed. 2019). “In a classic zero-sum game, such as poker, the total winnings exactly equal the total losses; any gain is at another player’s expense.” *Howes v. Atkins*, 668 F. Supp. 1021, 1026–27 (E.D. Ky. 1987).

⁵⁶ U.S. Post-Trial Brief at 51; 4 R.R. at 1058:4–18 (Thomas).

Project is not operated to provide any flood mitigation benefits to upstream areas.⁵⁷ Indeed, as Thomas admitted, the Corps cannot—as a matter of law—decide to operate the dams in a manner to protect the Upstream properties at the expense of those Downstream *without prior authorization from Congress* that alters the designated public purpose of the project.⁵⁸

Indeed, the record confirms that the Government did not make a single discretionary decision regarding the operation of the gates during Harvey. To the contrary, its actions were governed entirely by the 2012 Water Control Manual, including its induced surcharge flood control regulations.⁵⁹ *There was no discretion exercised by the Corps*; instead, the Water Control Manual was simply followed to the letter.⁶⁰ Both Mr. Thomas and Mr. Long explained that the purpose of the surcharge regulations is related to the Downstream properties only, not helping the Upstream ones.⁶¹ As a result, the Government’s claim that Harvey was an “emergency” requiring tough decisions is simply false.⁶²

In addition, it is absolutely incorrect for the Government to argue that the “United States gained no benefit from the flooding that occurred.”⁶³ The Project performed as intended, and the

⁵⁷ 1 R.R. 65:10–16; 1 R.R. 103:19–104:3 (Thomas); 1 R.R. 104:10–12 (Thomas agreeing that purpose of releases was not to help upstream folks); 6 R.R. 1473:1–7 (Long agreeing that opening the gates during Harvey was not done to reduce flooding on upstream properties).

⁵⁸ 2 R.R. 428:23–429:12.

⁵⁹ JX 110 Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries, San Jacinto River Basin, TX, Water Control Manual (November 2012, USACE 016339, USACE 016435–36); 4 R.R. 983:7–16 (Thomas).

⁶⁰ 4 R.R. 986:6–987:8.

⁶¹ 6 R.R. 1473:1–7 (Long); 1 R.R. 103:19–104:3; 1 R.R. 104:10–12 (Thomas).

⁶² U.S. Post-Trial Brief at 49–50. Indeed, the trial record confirms that the Corps did not ever even declare any “Emergency Level” 1, 2, or 3 during Harvey pursuant to the Emergency Action Plan in place for the Project. JX 118, Water Impact Tables in the Corps’ 2014 Emergency Action Plan (USACE 01977–76).

⁶³ U.S. Post-Trial Brief at 87.

Government reaped the benefits of occupying over 7,000 acres of private lands with impounded stormwater runoff. The record is replete with evidence of the enormous public benefit the Project provides to downstream properties. For example, the Corps estimated that the dams prevented more than \$6.96 billion of net losses to properties downstream of the reservoirs during Harvey.⁶⁴ Corps modeling estimated that an additional 13,000 structures downstream would have flooding during Harvey without the Project.⁶⁵ Further, the Corps estimates cumulative Project benefits to be \$24.98 billion through FY17.⁶⁶ The Government itself states that “the Project almost certainly saved far more than the eight lives lost during the 1935 Storm.”⁶⁷ The problem for the Government here is that those benefits were achieved solely for the Downstream properties at the expense of the Upstream property owners who bore the severe burden imposed by the Government’s actions, framing a classic constitutional obligation to compensate the Upstream property owners. *Ark. Game & Fish Comm’n v. United States*, 568 U.S. 23, 31 (2012). The Government was not caught unawares in an alleged “zero sum game,” but if it were, the winner here was the Government—fulfilling its mandate to protect downtown Houston and saving Downstream properties billions of dollars in avoided damage, at the expense of the Upstream property owners.

Finally, the Government cannot complain of the situation it faced since that condition was one of its own making. Over the decades, the Corps repeatedly rejected the option of acquiring property interests that would have either prevented flooding private upstream homes, or giving the Corps

⁶⁴ 1 R.R. 164:18 –165:12 (Thomas); 1 R.R. 161:7–11 (Thomas agreeing that dollar figure does not include damages from downtown to the ship channel); JX 228, FY 2017 Annual Water Control Report at VII-7 (June 2018, USACE869495) (after accounting for impacts caused to upstream and downstream).

⁶⁵ 5 R.R. 1276:9–17 (Buchanan); PX 164; PX 168.

⁶⁶ JX 228, FY 2017 Annual Water Control Report at VII-7 (June 2018, USACE 869488).

⁶⁷ U.S. Post-Trial Brief at 54.

the legal right to do so.⁶⁸ Had there been flowage easements on the Upstream land, no homes or businesses would have been built within the Project's reservoir boundaries.⁶⁹ The Government's decision not to acquire the legal right to store the stormwater runoff its Project was designed and intended to retain militates against the Government's attempt to avoid its constitutional obligation to pay just compensation to these Test Plaintiffs by saying "it had no choice." Instead, the record shows that the Government chose to embrace an operating concept that imposes flooding on private lands with no legal right with full awareness of the attendant consequences.

D. The Government's Attempt to Lay the Blame on Plaintiffs, the Counties, and other Factors must be Rejected.

The Government's litigation strategy of blaming everyone but itself runs counter to the factual evidence which shows that it solely operated the Project, and that it understood the consequences of its own actions. The tactic is also irrelevant to the legal standard for physical takings.

1. The attempt to lay the blame on Plaintiffs is legally irrelevant, belied by the record, and breach of the public's trust.

The Government's attempt to blame the Test Plaintiffs for a lack of knowledge of flood risk to their properties is foreclosed by the legal standard for a physical taking. There is no legal issue of "notice," "assumption of the risk," or "moving to thee nuisance" on the part of the plaintiff in a physical taking case; the only issue of "knowledge" is the foreseeability inquiry regarding the

⁶⁸ E.g., 1 R.R. 289:5-21 (1980s decision not to purchase 8,700 acres); PX 48 (document showing the OCE is in agreement that upstream real estate should be purchased, but this never happened); JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995 study where no action alternative was selected). As explained by Mr. Thomas, the so-called "no action" alternative was selected as part of the 1995 Reconnaissance Report. 2 R.R. 377:2-6; 392:13-17 (Thomas); *see also* JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015136, USACE 015147). And the Government made its decisions knowing that litigation could result. JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015140, USACE 015301).

⁶⁹ 4 R.R. 1036:9-12.

knowledge of the Government. See *Ridge Line*, 346 F.3d at 1355 (noting the takings liability issue focuses on government knowledge or intent); see also *Hansen v. United States*, 65 Fed. Cl. 76, 117 (2005) (noting *Ridge Line* test is disjunctive requiring either intent or causation on the part of the government). The Government’s tort-based arguments that the Plaintiffs were put on notice—whether through USGS maps, plat language, or a Corps meeting from the early 1990s—are legally irrelevant here.

Moreover, as discussed in Plaintiffs’ Opening Post-Trial Brief, the concept of “reasonable investment-backed expectations”—the “hook” by which the Government seeks to introduce this irrelevant inquiry—is only to be applied in regulatory takings cases, not in physical takings. See *Preseault v. United States*, 100 F.3d 1525 (Fed. Cir. 1996) (“The Government’s attempt to read the concept of ‘reasonable expectations’ as used in regulatory takings law into the analysis of a physical occupation case would undermine, if not eviscerate, long-recognized understandings regarding protection of property rights; it is rejected categorically.”). This was discussed in the Plaintiffs’ Opening Post-Trial Brief.⁷⁰ Crediting the Government’s argument would be a sea change in takings jurisprudence and must be rejected. And while the Court need not engage in any further analysis of the matter, in an abundance of caution Plaintiffs will respond to the Government’s argument.

First, factually, all Plaintiffs testified that they did not know their properties were located inside the Government’s Addicks and Barker reservoir pools.⁷¹

Second, at most, the Government is left with the argument that the Plaintiffs should have known their properties were located inside a federal reservoir pool. But even accepting this argument

⁷⁰ See generally Plaintiff’s Opening Post-Trial Brief at 116 & n. 541.

⁷¹ E.g., 6 R.R. 1729:10-15 (Banker); 6 R.R. 1758:15-1760:3 (Burnham); 6 R.R. 1654:8-18, 6 R.R. 1651:8-17 (Giron); 7 R.R. 1834:14-16 (Holland); 5 R.R. 1413:15-1414:5 (Strebel, Lakes on Eldridge Community Association); 5 R.R. 1293:24-1294:15 (Micu); 5 R.R. 1225:2-17 (Popovici); 6 R.R. 1738:9-17 (Sidhu); 4 R.R. 1076:22-1078:3 (Soares); 6 R.R. 1607:19-22 (Stewart); 7 R.R. 2151:16-20 (Turney); 6 R.R. 1626:1-1627:7 (Wind); 7 R.R. 2120:20 - 2121:5 (Lesikar, West Houston Airport Corporation).

on its face—and its legal relevancy, which Plaintiffs contest—the evidence does not establish that the Plaintiffs should have known that the Project’s true boundaries engulf their properties. The Government presented no evidence to support this irrelevant argument; the Government’s expert, Dr. Galloway, who was to opine about the Plaintiffs’ ability to understand the “flood proneness” of their properties, was struck.⁷² Nothing in the record ties the “availability” of any alleged publicly available information to some “objective standard” of what a given Test Plaintiff “should have known” about the risks of Project-induced flooding.

The Government proceeds to expend numerous pages detailing a litany of obscure data, maps, and web-based information that still fails to show a widespread and transparent information campaign by the Corps sufficient to put the public at large or a prospective property purchaser on notice about the actual extent of the reservoir pools and the specific private properties located within them. For instance, the Government presses that Houston is naturally “flood prone.”⁷³ But to say Houston is flood prone, or that Houston “has always struggled with flooding,”⁷⁴ or that all Houston residents have flood “risk,”⁷⁵ ignores that the upstream flooding was a man-made condition due to the Government’s dam—not a natural condition like “flatness.” It was the Corps that imposed the flood risk on these Upstream properties, not natural conditions. The fact that Houston is close to the Gulf of Mexico where hurricanes are likely to form—discussed by the Government as an apparent defense—only serves to highlight the foreseeability of the destruction wrought by the Government’s actions.

⁷² See 8 R.R. 2483:15-19 (Galloway); 8 R.R. 2542:24-2543:3 (Levine). Galloway’s testimony on “flood proneness,” even if allowed, would have provided no evidence regarding the risk of Project-induced flooding as he admitted “that was not an indicator on my list.” 8 R.R. 2531:22-2532:3.

⁷³ U.S. Post-Trial Brief at 16.

⁷⁴ U.S. Post-Trial Brief at 2.

⁷⁵ U.S. Post-Trial Brief at 3.

The Government also put on no evidence that an average citizen would know how to read and comprehend the hydrology information it touts. Key maps might notate “elevation 114 feet” but there is no other information to demonstrate the consequence of that notation to a typical reader.⁷⁶ And with regard to FIRM maps, as Mr. Nakagaki confirmed, they do not actually depict reservoir pool flooding, so they provide the Government no support for its argument.⁷⁷ In fact, Mr. Nakagaki testified that these maps were not even available to the public as an online resource until the 2000s, well after many Test Plaintiffs purchased their property.⁷⁸

Moreover, just because information may be discoverable does not mean that the Test Plaintiffs (or the general public for that matter) had any duty to seek it out, knew how to access it, or that the information is readily comprehensible. For example, not a single Plaintiff testified that they reviewed a subdivision plat before they bought their property.⁷⁹ There was no evidence presented that plats are reviewed in a real estate closing; in contrast, the actual evidence showed that homeowners typically read are the seller’s disclosures, provided by a real estate agent, not items like those plats or key maps.⁸⁰

In addition, the evidence showed that the language the Government cherry picks from these arcane sources was not effective in informing the public. Indeed, when the Fort Bend County Drainage District’s Chief Engineer, Mr. Vogler, was asked whether the “plat language was successful in informing the public of the risks associated with being submerged by the Barker Reservoir pool?” Mr.

⁷⁶ *E.g.*, DX 795.

⁷⁷ 8 R.R. 2374:23-2376:4, 2379:22-25 (Nakagaki) (stating that FEMA mainly provides risk information for natural disasters, and that for the federal reservoir information, “the map does not speak to that”).

⁷⁸ 8 R.R. 2351:25-2352:2.

⁷⁹ *E.g.*, 5 R.R. 1295:8 (Micu); 1660:16 (Giron); 1707:11 (Banker).

⁸⁰ *E.g.*, 5 R.R. 1225-26 (Popovici) (explaining that she looked at the seller’s disclosure list).

Vogler pointedly answered, “No sir.”⁸¹ And only Fort Bend, not Harris, County had this subdivision plat notation. In light of Mr. Vogler’s testimony, and because plats are not routinely reviewed by prospective purchasers, the subdivision plats do not represent evidence that Fort Bend County Plaintiffs should have known their properties are inside a reservoir pool. In fact, the plat language stated the Plaintiffs’ subdivisions were “adjacent” to the Barker Reservoir, not in it.⁸²

Other documents like 1980s NEPA forms, the 1995 Reconnaissance Report, ABECT communications, or a newspaper article similarly provide no basis to strip Plaintiffs of their constitutional protections. A buried sentence in a 1981 NEPA document hardly constitutes a vigorous public information campaign by the Corps. The most Mr. Thomas could offer regarding the 1995 Reconnaissance Report was that “as far as he knows” it went to the public, which is not particularly persuasive when it pre-dates his time at the Corps.⁸³ The Government’s communications through ABECT (and two local authorities) leading up to Harvey were labelled “For Internal Use Only”, and not publicly disseminated, which was true of many other Governmental reports.⁸⁴ The 1980s Houston Chronicle article provides no information of the full extent of the reservoir pools; the tiny map included in the article shows dark shading only, no streets, and no identifying property information.⁸⁵ And of course, a single 1980s local news article is of no help to people moving to Houston after the date of the article.

⁸¹ 3 R.R. 682:10.-16.

⁸² See U.S. Post-Trial Brief at 33 (quoting language and citing relevant exhibits).

⁸³ 1 R.R. 114:5-13 (Thomas).

⁸⁴ JX 146, CWMS Forecast for August 25, 2017; see also JX 228, FY 2017 Annual Water Control Report (June 2018) (labelled official use only); 1 R.R. 158:22 -159:23 (Thomas agreeing that the document labelled “official use only” means not to be shared with the public); PX 51, Dam Safety Assurance, General Design Memorandum (June 1984) (also labelled “official use only”); 2 R.R. 335:20 – 336:6 (Thomas).

⁸⁵ DX 71. It bears noting that this article related to a proposed plan that would have lowered the ends of the dams; this plan was never implemented. Instead, the embankments were raised.

The fact that the Government chose to introduce such information into the trial record does not mean that any Plaintiff saw them, or reasonably believed it necessary to study them and understand them.⁸⁶

Critically, the Government conducted a first-floor elevation survey of private property located inside the Project's reservoir boundaries.⁸⁷ As a result, the Government had detailed maps showing the very address of the specific properties its Project would occupy with impounded flood waters. But the Government still failed to notify those homeowners of the risk of Project inundation.⁸⁸

In light of the information that the Government gathered and actually could have provided to homeowners—but did not—the Government cannot now accuse the homeowners that they “should have known” about their homes were inside the Government's reservoir pools.⁸⁹

⁸⁶ Had the Corps actually been engaged in a widespread, transparent information campaign to the public, the Corps might have had evidence in the form of yearly mailers to every Upstream property address (including those it had surveyed and which it knew would flood) or pages on its own website with explanatory maps detailing the full extent of the reservoirs' maximum design pools and the anticipated flooding effect on every property located within them. But the Government offered no evidence of the sort. Instead, the Government feebly offered evidence of a few meetings, scattered through the years, with insignificant attendance—hardly sufficient given that upstream flooding victims could number in the thousands and the significant turnover of these residential properties. Plaintiff's Opening Post-Trial Brief, ECF No. 235, at 122 (discussing these meetings); PX 1747 (Long email describing flooding of thousands).

⁸⁷ 1 R.R. 100:8-16 (Thomas); 1 R.R. 170:19-25 (Thomas); 1 R.R. 273:3-7 (Thomas: “we had data indicating the first level elevations of those homes and information about the pool level”).

⁸⁸ See PX 2289, 2290, and 2292 (shapefiles of surveyed structures in Project's flood pools); see also 5 R.R. 1289:2-15 (Micu) (“I had no idea they made that map. I wish that we would have known.”).

⁸⁹ See 5 R.R. 1289: 14 (Micu) (stating she would have liked to have seen the Government's elevation survey information on her home); 1662:17 (Giron). And Plaintiffs stand by their evidence supporting the inference of a “misinformation” campaign by the Corps. See Plaintiff's Opening Post-Trial Brief, ECF No. 235, at 122. Among some of the examples: (a) the Government's misleading and confusing equation of the “reservoirs” or the “project boundary” with the Government-owned land, instead of the full extent of the reservoir's design pool, see 2 R.R. 390:5-8 (Thomas admitting the use of these terms); (b) the 1973 memo by the Chief of the Galveston District's Engineering Division noting that the Government needed to come up with a plausible story “for our operating concept of imposing flooding on private lands without benefit of flowage easement or other legal right” since this fact “is expected to soon become a public issue,” PX 37, Memo: Addicks and Barker Reservoirs – Encroachment on Private Lands (May 3, 1973, USACE 667927); (c) the 1980 Corps memo noting that the

2. Neither Fort Bend nor Harris County holds responsibility for the Project, and the Government considered—but rejected—condemning flowage easements or private property upstream.

As with the Government's attempt to lay blame on the Plaintiffs, the Government's finger pointing at local governments is also legally irrelevant. The Government's Project was the sole cause of the maximum inundation suffered by each Test Plaintiff, not any action by any local government.

And while local county governments do issue permits for development outside federally owned land, the Corps was entirely aware this was taking place. Indeed, though the Government emphasizes the Corps "does not control" development,⁹⁰ once again it was a willing participant in the circumstance about which it now complains. The Government could have acquired flowage easements or condemned the properties in fee—both of which were in keeping with standard Corps procedures.⁹¹ At trial, Mr. Thomas conceded that, had the Corps purchased additional real estate, in

public "had not been informed" of the problem of upstream areas being subject to flooding outside existing government fee line," JX 26, Memo: Buffalo Bayou and Tributaries – Spillways for Addicks and Barker Dams (September 5, 1980, USACE 530470) (emphasis added); (d) the 1992 memo which recognized that while "[u]rbanization of the privately owned land that borders the Government Owned Land (GOL) has resulted in the erection of structures within the maximum pool zone. Homeowners are largely unaware of their situation," PX 1406, Memo: Buffalo Bayou and Tributaries, Texas, Addicks and Barker Reservoirs: Special Report of Flooding (June 30, 1992, USACE 529848); (e) the 1989 incident when the Corps downplays the importance of the comments regarding development inside the Project reservoirs on a USGS quad map [comments which it *now* touts in its defense], at that time calling them "misleading," PX 2284, Memo: Barker Reservoir Pool Elevation; Kelliwood (August 24, 1989, FB 0000633); and (f) the evasive answers provided in 1999 to the president of a homeowner association management company asking about "rumored plans to allow the area to flood,"—telling them there was no such "current plan," DX 933, Response of Col. Nicholas Buechler, District Engineer at 1-2 (Undated, USACE 464797-98).

⁹⁰ U.S. Post-Trial Brief at 13-14.

⁹¹ In September 1980, the Corps wrote: "The acquisition of upstream lands to comply with ETL 1110-2-22 has been estimated to cost \$353 million. The areas on the upstream side of the reservoirs are developing quickly. Should additional lands (primarily the undeveloped ones) not be purchased now, the opportunity will probably be lost forever." JX 26, Memo: Buffalo Bayou and Tributaries – Spillways for Addicks and Barker Dams at 2 (September 5, 1980, USACE530471). *See also* PX44 at USACE570692 (document entitled "Buffalo Bayou and Tributaries, Spillways for Addicks and Barker

accordance with such procedures and recommendations from governmental documents, thousands of homes would have been spared the severe damage resulting from Project-induced flooding during and after Harvey.⁹²

In 1995, the Corps re-visited the Project-related flood risks associated with standard Project operations. The Corps weighed whether to, amongst other options, “Increase reservoir storage by purchase of flowage easements in the fringe areas adjacent to GOL over existing developed properties” or “Increase reservoir storage capacity by means of buy-out and relocation of developed properties” or “Accept existing conditions and risk through No Action.”⁹³ The Corps made the affirmative decision to accept the risk and consequences of Project-induced flooding by doing nothing.

Indeed, the Government internally acknowledged that its decisions would facilitate development within its reservoir’s footprint. As Mr. Thomas readily conceded at trial, the Government “could have said no” to these requests, yet did not.⁹⁴ In 1981, the Corps elected to revise its prior policy of declining all requests for drainage improvements on reservoir lands after determining this revision would have no “significant effect on the operation of the reservoirs.”⁹⁵ The Corps neutralized potential adverse Project impacts from such channels by mandating that any channels extending onto Government-owned land not exceed 1979 “in bank” flow rates.⁹⁶

Dams” dated 1980) (stating that the “acquisition of reservoir lands would be in accordance with guidance set forth in ER-405-2-150”); 1 R.R. 282: 4-7 (Thomas) (conceding that the historical document is saying “acquisition of that upstream real estate is necessary to comply with the regulation”).

⁹² 2 R.R. 289:5-21.

⁹³ JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015137).

⁹⁴ 2 R.R. 387:1-4.

⁹⁵ JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015216) (App’x 2).

⁹⁶ *Id.* at USACE 015144 (describing Corp’s 1979 existing conditions policy).

E. No Government Action Provided any *St. Bernard Parish* Type of “Offset” or Relative Benefit to Upstream Properties.

In the recent *St. Bernard Parish* case, the Federal Circuit analyzed whether the federal flood control project, in combination with other federal projects, had provided any relative benefits to the specific properties in the case before it: “When the government takes actions that are directly related to preventing the same type of injury on the same property where the damage occurred, such action must be taken into account even if the two actions were not the result of the same project.” *St. Bernard Par. Gov’t v. United States*, 887 F.3d 1354, 1366 (Fed. Cir. 2018) (emphasis added). Here, the federal project at issue is the Buffalo Bayou & Tributaries Project, and neither it, nor any other federal project, provided offsetting benefit to the Test Plaintiff’s properties.⁹⁷

1. The sole purpose of the Buffalo Bayou & Tributaries Project is the protection of Downstream properties.

The Buffalo Bayou & Tributaries Project provides flood risk protection downstream—to the City of Houston, the ship channel turning basin, and the various structure that are downstream along Buffalo Bayou.⁹⁸ As explained by multiple witnesses at trial, that goal is the sole purpose of the Project; there is no flood protection intended for or conferred by this Project to any Upstream property.

For example, according to Mr. Thomas, the Buffalo Bayou & Tributaries Project is not operated, constructed or used to provide flood mitigation benefits to the Upstream people who live behind the dams.⁹⁹ Likewise as demonstrated by a Corps-created graphic depicting structures that had less flooding due to the Project, none of the relevant “green dots” marking flooding reduction appeared

⁹⁷ 1 R.R. 57: 1-2 (Thomas).

⁹⁸ 1 R.R. 64: 20-25 (Thomas); 6 R.R. 1454:9-19 (Long); 2 R.R. 550:8-11 (Lindner).

⁹⁹ 1 R.R. 65: 10-14; 2 R.R. 429:4-7; 4 R.R. 1011:1-3.

behind the dams—because Upstream properties did not benefit from the dams.¹⁰⁰ And according to Mr. Long, the Project does not provide any flood control protection Upstream of the dams.¹⁰¹ The Corps operates the Project to solely protect Downstream life and property.¹⁰²

Indeed, in all respects, the Upstream properties receive no benefit whatsoever from the Project. Even when the Army Corps classified the Addicks and Barker dams as “highest risk,” Mr. Thomas clarified that “the risk that’s driving their high rating is associated with the potential for failure and the downstream consequences.”¹⁰³ Not only does the Project provide no upstream benefits, but there are no other federal projects that provide any measure of flood protection to the upstream properties either. At trial, Mr. Thomas confirmed that the Project is the only federal project affecting these upper Buffalo Bayou watersheds.¹⁰⁴

2. The outgrants were issued to ease developers’ compliance with County development regulations and provided no flood mitigation benefit for the reservoir pool flooding; if anything, they exacerbated the upstream flooding risk.

In its brief, the Government discusses the “outgrants” that were given to developers or local authorities beginning in the late 1970s. These outgrants took many forms, ranging from utility corridors, park and recreational use, grazing leases, roadway easements, and also for drainage ditches.¹⁰⁵ However, these outgrants fail to constitute a relative benefit within the meaning of *St. Bernard Parish*

¹⁰⁰ 5 R.R. 1279:16-22; PX 168.

¹⁰¹ 6 R.R. 1453:21-24; 1458:7-16 (Long).

¹⁰² 6 R.R. 1458:7-16 (Long).

¹⁰³ 4 R.R. 1010:1-4, 16-17

¹⁰⁴ 4 R.R. 1023:10-1024:3.

¹⁰⁵ 4 R.R. 864:1-10; JX 91, 2009 Master Plan (August 2009, USACE016055) (outgrants summary as of 2009).

for several reasons. **First**, none of the drainage ditches are federal projects. Even if facilitated by the outgrants, the federal government cannot expropriate work performed by others, which provides no protection against Project-induced flooding, for purposes of the analysis undertaken in *St. Bernard Parish*. The Government *received* monetary payments from the developers, MUD districts, or Counties in exchange for use of federal land.¹⁰⁶ As discussed above, the ditches did not interfere with Project operations, and the Corps was careful to limit inflows to 1979 existing conditions. Further, and as discussed in more detail below, because the drainage ditches are not part of any federal project, they are irrelevant to any “no project” causation analysis.

Second, the outgrants were never intended to provide Upstream flood protection against Project-induced flooding.¹⁰⁷ The plain purpose of the outgrants was to enable developers (sometimes through a MUD district or county project) to build homes and subdivisions and use less land for detention features; they had absolutely no purposes to reduce the man-made flooding caused by the Addicks and Barker dams.¹⁰⁸ The outgrants therefore cannot be an offsetting “relative benefit” under the analysis in *St. Bernard Parish* because they were not intended to, nor do they, address or operate to minimize the “relevant risk”—Project-induced submersion of these properties. *See St. Bernard Par. Gov’t*, 887 F.3d at 1364; *id.* at 1366 (“there is no question that the LPV [levee] project was directed to decreasing **the very flood risk** that the plaintiffs allege was increased by the MRGO project”) (emphasis added).

Nor were the outgrants even essential to Upstream development. Had the Corps maintained its prior policy, the upstream lands would simply have developed differently as the developers would

¹⁰⁶ *See, e.g.*, DX 94 (showing an easement for \$164,000).

¹⁰⁷ U.S. Post-Trial Brief at 14.

¹⁰⁸ *See* JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015144).

have used other techniques to comply with County development regulations. As Mr. Vogler explained, if the channels had not come onto Government-owned land, then the county would have required additional detention or retention features within a development, but they would have gone forward.¹⁰⁹

As a result, Ms. Johnson-Muic's allegation the outgrants were "the only means to drain" upstream areas is simply not true. In simple terms, the drainage ditches made subject of the outgrants were alternatives to developers building detention basins to be in compliance with County development regulations and the Corp's 1979 existing conditions policy.

In fact, the rights granted in the outgrants are very clearly subordinate to the Addicks and Barker Project's purpose. For example, language in the easement states that "the United States reserves the right, power and privilege to submerge, inundate, and overflow occasionally, intermittently, or constantly, all or any portion of the easement area herein granted as may be necessary in the operation and maintenance of the Buffalo Bayou Flood Control Project or other Government purposes. The grantee shall have no claim for damages of any character on account thereof against the United States."¹¹⁰ Other Corps documents show that all outgrants are subordinate to the Government's Project and its authorized purpose.¹¹¹ The outgrants were always evaluated against the purpose and objectives of Project—which never included protecting the Upstream properties against Project-induced flooding.¹¹² Because the outgrants are not federal projects and because they did nothing to

¹⁰⁹ 4 R.R. 817:7-11.

¹¹⁰ DX 95 at FB0025607.

¹¹¹ JX 91, Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries, Fort Bend and Harris Counties, Texas, 2009 Master Plan (August 2009, USACE 016052) (all Project lands are allocated to Operations, meaning the safe and effective operation of the reservoirs take precedence over all other uses).

¹¹² JX 91, Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries, Fort Bend and Harris Counties, Texas, 2009 Master Plan (August 2009, USACE 016059).

reduce the risk of Project-induced pool flooding whatsoever, they play no part in any relative benefit analysis within the meaning of *St. Bernard Parish*.

Third, if anything, the outgrants *exacerbated* the Project-induced flood risks for the upstream properties. The Government's own documents show that "Channelization onto GOL would increase the inflow of sediment into the reservoirs resulting in the loss of flood storage capacity;" "watershed development would increase runoff volumes resulting in more frequent and larger impoundments;" and "Channel improvements would lower regulatory stream flood profiles resulting in development of the reservoir fringe at lower slab elevations [which] will increase flood damages resulting from reservoir impoundments;" among other things.¹¹³ Thus, as the Government itself identified, the outgrants reduced the need for detention on private land, facilitated building more homes in the Project's reservoir pools, which only increased the inevitable damages resulting from Project-induced flooding.

For all these reasons, the situation posed by outgrants within the Addicks and Barker reservoirs is nothing like the situation posed by the Mississippi River-Gulf Outlet (MRGO) channel and related levee system in *St. Bernard Parish*. Indeed, *St. Bernard Parish* observed that the Corps had expended \$56 million to construct levees along the banks of MRGO to protect citizens from hurricane storm surges and risks posed by MRGO. *St. Bernard Par. Gov't v. United States*, 887 F.3d 1354, 1358 (Fed. Cir. 2018), cert. denied sub nom. *St. Bernard Par. v. United States*, 139 S. Ct. 796 (2019)(emphasis added). Although the plaintiffs specifically complained about MRGO, the levee construction offset the relative harm of MRGO. *Id.* at 1357-58

¹¹³ JX 52 Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015144-45).

Notably, in a 1980 document, the Corps speculated that the “possibility exists of reducing costs by protecting some of the existing [upstream] development with levees in lieu of land acquisition.”¹¹⁴ Had such levees been built (presumably on the upstream side of the Government-owned land), which would have prevented at least some reservoir pool water from flowing into the Upstream residential neighborhoods, then perhaps such levees could have represented an offset similar to the levees in the *St. Bernard* case. A levee on the back side of the Addicks or Barker dams might have addressed the “relevant risk” within the meaning of *St. Bernard* if it causally prevented reservoir pool flooding, but such levees were never built Upstream of the Addicks and Barker dams.

Here, the Government has done nothing to protect Upstream plaintiffs against Project-induced flooding.¹¹⁵ The Government readily admits that standard Project operations dictate using all available storage capacity – including Upstream private property with homes and businesses – to effectuate the Project’s purpose of protecting downstream.¹¹⁶ In fact, Mr. Thomas admitted that is

¹¹⁴ JX 26, Memo: Buffalo Bayou and Tributaries – Spillways for Addicks and Barker Dams (September 5, 1980, USACE 530471).

¹¹⁵ 1 R.R. 86:1-14 (Thomas testimony that there are no embankments or levees between government-owned reservoir land and privately-owned reservoir land).

¹¹⁶ 1 R.R. 174:15-175:14.

exactly what happened during Harvey.¹¹⁷ Here, there simply is no offset against Project-induced flooding.¹¹⁸ Accordingly, as the Government concedes in its own documents, the recent discussion in *St. Bernard Parish* offers the Government no additional line of defense in the present case.¹¹⁹

II. THE GOVERNMENT’S EXPERTS DID NOT REBUT PLAINTIFFS’ PROOF.

None of the Government’s expert witnesses rebutted Plaintiffs’ proof that the flooding of each upstream Test Property during Harvey was the direct and intended result of the Government’s design, construction, and operation of the Addicks and Barker dams.

A. The Report and Testimony of Dr. Robert Nairn does not Counter Plaintiffs’ Causation Proof.

Instead of rebutting the issue of causation, Dr. Robert Nairn’s report and testimony confirms that Project-induced submersion caused the maximum level of flooding for each Test Plaintiff. This alone, independently, demonstrates the required causation for Plaintiffs’ claims.

¹¹⁷ *Id.*

¹¹⁸ Cases cited by the *St. Bernard* court are also instructive. The Federal Circuit relied in part on *John B. Hardwicke Co. v. United States*, 467 F.2d 488 (Ct. Cl. 1972), where the government had constructed two dams as part of a flood control project; the first dam decreased the risk of flooding on the plaintiff’s property, while the second dam increased the risk of flooding. *St. Bernard Par. Gov’t*, 887 F.3d 1354 at 1364. Because “overall the expectation of flooding was still far less than it would have been if there had been no flood control program at all,” that court concluded the government was not liable for a taking. *Id.* (internal quotations omitted). Here, the outgrants do nothing to alter the overall expectation of Project-induced flooding, as was demonstrated during Harvey (*i.e.*, there is no evidence showing the outgrants ameliorated reservoir pool flooding).

¹¹⁹ JX 52, Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015301-02) (“The relative benefits doctrine often protects the United States from liability for downstream flood damages, but is rarely applicable as a defense to upstream claims.”).

To the extent the Government tries to use other testimony from Dr. Nairn to obfuscate this clear, dispositive admission, that tactic should be rejected as the data and modeling Nairn uses in providing the “evidence” the Government relies on is flawed.

1. **Dr. Nairn conceded each Upstream Test Property flooded during Harvey because of the Addicks and Barker dams. Indeed, Dr. Nairn confirmed that the maximum inundation suffered by each Plaintiff was caused by the Government’s project, proving causation on behalf of each Test Property Plaintiff.**

The Government acknowledged in the Downstream case that causation is shown by proof that “Plaintiffs’ properties would have experienced less flooding during Hurricane Harvey if the Project had not been built.”¹²⁰ *See also United States v. Spontenbarger*, 308 U.S. 256, 266 (1939) (noting liability accrues where the Government has subjected a plaintiff’s land to any additional flooding above what would have occurred if the Government had not acted).

Dr. Nairn offered that exact proof at trial when he testified that the maximum-level inundation for each test property resulted from the impoundment of stormwater runoff behind the dams.¹²¹ That admission alone—that the Government subjected each Test Property to additional flooding above what would have occurred without the projects—directs a finding of causation.

Independently, Dr. Nairn concedes that the Banker, Lakes on Eldridge, Holland, Popovici, Sidhu, Soares, Stewart, Turney, West Houston Airport Corporation, and Wind properties would not

¹²⁰ *In re Downstream Addicks & Barker (Texas) Flood-Control Reservoirs*, No. 17-9002L, ECF No. 183 at 2 (urging the court to grant its cross-motion for summary judgment because “[t]here is no claim, and no corresponding proof, that Plaintiffs’ properties would have experienced less flooding during Hurricane Harvey if the Project had not been built”).

¹²¹ 9 R.R. 2777:1-6; 20-23 (Nairn); *see also* DX0608, Expert Report of Dr. Robert Nairn at iii (“With the federal project in place, peak flood elevations at all the upstream Test Properties are attributed to backwater due to high pool elevations in Addicks or Barker Reservoirs . . .”); *id.* at 94 (“Peak flood elevations at all the upstream Test Properties are attributed to backwater due to high pool elevations in Addicks or Barker Reservoirs.”).

have flooded at all during Harvey but-for the Addicks and Barker Projects.¹²² As to those ten Test Properties, then, even the Government’s own expert acknowledges that there is no question of causation and that the sole cause of their inundation during Harvey was the impoundment of stormwater behind the dams.

Finally, as the record shows, the only test properties that Dr. Nairn’s analysis even tries to challenge (in terms of alleged riverine sources) are those of Ms. Burnham, Mr. Giron, and Ms. Micu. But the record shows that the data, assumptions, and methodology Dr. Nairn employed when making his assertions about these three (3) properties render his opinion unreliable. In reality, they too were flooded solely because of the Project and (as admitted) suffered their maximum inundation because of the Project. With those concessions, the Report and Testimony of Dr. Robert Nairn cements the causation analysis with regard to each and every Test Property Plaintiff.

2. Dr. Nairn’s manipulated methodology and patently invalid input data renders his testimony unreliable.

In trying to salvage some use of the work commissioned from Dr. Nairn, the Government strains to overcome the clear admissions regarding causation discussed above. This gambit too should be rejected. Dr. Nairn’s methodology is results-driven and unreliable, and his wholesale failure to investigate or incorporate local drainage into his model cannot be excused because “the analysis was difficult.”¹²³ At the outset, Dr. Nairn admits that his use of the TELEMAT modeling software did not

¹²² 9 R.R. 2777:13-23 (Nairn); DX0608, Expert Report of Dr. Robert Nairn at iii (“Our modeling efforts demonstrate that finished first floors on three of the thirteen upstream Test Properties would have experienced some flooding even in the absence of the federal project, which includes the Addicks and Barker Reservoirs.”). *See also* Plaintiffs’ Opening Post-Trial Brief, ECF No. 235, at 54.

¹²³ U.S. Post-Trial Brief at 81 (“The aggressive pre-trial schedule rendered these additional analyses impracticable.”); *id.* at 68 fn. 57 (Nairn did not include stormwater drains in his analysis “because that analysis was difficult and the trial schedule did not provide sufficient time to address those complications”).

“follow[] the standard approach,”¹²⁴ and that he specifically chose not to use the software to identify the source of flood water for each test property—even though the software allowed for it.¹²⁵ Instead, his initial analysis focused on a single factor: his model’s prediction of the reservoir pools’ water surface elevations (regardless of the actual observed data).

To predict water surface elevations at the Test Properties, Dr. Nairn first altered TELEMAT’s source code so he could input rainfall data provided by William Kappel of Applied Water Associates (“AWA”).¹²⁶ Dr. Nairn did not submit this *ad hoc* source code for third party or peer review (such as to the consortium that maintains the source code) to confirm its accuracy or validity.¹²⁷ There is simply no evidence that the altered source code meets any accepted industry standards, and he conceded at trial that if he had not altered the source code his results would have been different.¹²⁸ This alone renders his testimony unreliable.

To compound the potential for error, Dr. Nairn used his new source code to input AWA’s rainfall data, which ignored every Harris County rain gage in the Addicks or Barker watersheds.¹²⁹ Instead, the record shows that the rainfall data relied on by Nairn came from dubious sources—including buckets, beer cans, and pickle jars—even though Harris County Flood Control District operated 154 rain gages of “the highest quality” throughout the county that measured rainfall on an

¹²⁴ U.S. Post-Trial Brief at 67.

¹²⁵ 9 R.R. 2691:24-2692:1; 9 R.R. 2780:6-16 (Nairn).

¹²⁶ 9 R.R. 2670:22-24; 9 R.R. 2673:12-21 (Nairn).

¹²⁷ 9 R.R. 2671:6-10; 9 R.R. 2672:19-2673:11 (Nairn).

¹²⁸ 9 R.R. 2674:3-7 (Nairn).

¹²⁹ 5 R.R. 1193:9-1194:2 (Kappel).

hourly basis during Harvey.¹³⁰ Inexplicably, Mr. Kappel chose to use rainfall data from *only four* of those 154 Harris County rain gages,¹³¹ not one of which was located within the operative watersheds.¹³² Instead, all four of the gages Kappel “selected” are located on the far east side of Harris County (*i.e.*, the area that received more rainfall than anywhere else in Harris County during Harvey).¹³³ For example, Kappel chose to include the data from the Clear Lake Gage, which received the maximum recorded amount of rainfall *in the entire county*.¹³⁴ Unsurprisingly, rainfall data from sources that are 40+ miles east of the Project were higher than the actual rainfall amounts into the Addicks and Barker watersheds as recorded by the county rain gages.¹³⁵ In fact, Mr. Kappel’s rainfall accumulation estimates are, at times, 100 percent different than the observed rain gage data.¹³⁶ By definition then, the data used in Nairn’s model is not representative of the rainfall experienced in the Addicks and Barker watersheds.

Nevertheless, Dr. Nairn accepted and relied on the AWA rainfall data at face value and undertook no effort to verify the data upon which his model relied.¹³⁷ As a result, his model expectedly overestimates the reservoir pool levels from Harvey, as well as many of the incoming tributaries’ water levels. Because he relied on inaccurate rainfall data, Dr. Nairn’s model does not accurately predict to a reasonable degree of certainty the rainfall runoff response of the Addicks and Barker watersheds

¹³⁰ 5 R.R. 1139:14-16; 5 R.R. 1184:3-11; 5 R.R. 1188:14-24 (Kappel).

¹³¹ 5 R.R. 1187:20-23 (Kappel).

¹³² 5 R.R. 1187:24-1188:6 (Kappel).

¹³³ 5 R.R. 1190:12-15; 1192:14-16; 5 R.R. 1191:23-1192:16 (Kappel).

¹³⁴ 5 R.R. 1191:23-1192:16 (Kappel).

¹³⁵ 5 R.R. 1185:9-13 (Kappel).

¹³⁶ 5 R.R. 1181:7-10 (Kappel).

¹³⁷ 9 R.R. 2675:8-2676:10 (Nairn).

and the resulting flood levels.¹³⁸ It is not surprising, for example, that Dr. Nairn's model over-predicts the reservoir pool flooding.¹³⁹ Dr. Nairn's model was designed and manipulated to accommodate the Government's concocted narrative that the inundation of Upstream Test Properties was unavoidable. Dr. Nairn's testimony should be rejected as demonstrably incorrect and therefore unreliable.¹⁴⁰

3. Dr. Nairn's "Actual Run" model exaggerates the effect of riverine flooding on Upper Buffalo Bayou by more than 3 feet, resulting in over-estimations of flooding at the Micu and Giron properties.

The Government attempts to use Dr. Nairn's "Actual Run" model scenario to assert that riverine flooding caused the inundation of the Micu and Giron properties with riverine flooding, even though both Dr. Nairn and Dr. Bedient agree that the peak flood elevation at every upstream Test Property was caused by the Harvey pool.¹⁴¹ Moreover, Dr. Nairn's "Actual Run" scenario is wrong.

This Government challenge too must be rejected. When compared to the USGS pool gages—which Dr. Nairn altogether ignored—his Actual Run model overpredicts the Barker maximum pool by 1.2 feet.¹⁴² Such an obvious over-prediction resulted in demonstrably false outcomes. For instance, Dr. Nairn's Actual Run model puts 0.6 feet of water inside the Popovici home from the Barker pool, even though eyewitness testimony and photographic evidence presented at trial (and available to Dr.

¹³⁸ Dr. Nairn chose to omit other crucial data that renders his testimony unreliable. For instance, he used 2008 LiDAR data, even though more recent LiDAR data was available. 9 R.R. 2781:19-21; 2784:11-21; R.R. 2785:3-7 (Nairn). As a result, his model fails to capture any changes in topography from 2008 through Harvey or any changes in land use from 2011 through Harvey.

¹³⁹ 9 R.R. 2677:1-8 (Nairn).

¹⁴⁰ 9 R.R. 2677:1-8 (Nairn).

¹⁴¹ 9 R.R. 2683:18-2684:1 (Nairn) (overpredicting observed water surface data by more than one foot in areas upstream of the dams); JX 143, USGS 08073000 Addicks Reservoir (USGS 08073000 Addicks Gage Data); JX 144, USGS 08072500 Barker Reservoir (USGS 08072500 Barker Gage Data).

¹⁴² 9 R.R. 2681:24-2682:4 (Nairn).

Nairn well beforehand) confirm the Harvey pool never rose high enough to enter the Popovici structure.¹⁴³

In addition, as Dr. Bedient explained at trial, Dr. Nairn's model misstating the peak stage levels at Upper Buffalo Bayou by nearly three feet caused Dr. Nairn to overstate the effect of riverine flooding at nearby locations, like the Micu and Giron residences.¹⁴⁴ According to Dr. Nairn's model, structural flooding from riverine overbanking began at both the Micu and Giron properties on August 27, 2017.¹⁴⁵ But in reality, stormwater had not even covered Ms. Micu's driveway, let alone entered her home, as of 9:55 am on August 28, 2017—an entire day after Dr. Nairn's model put floodwater inside her residence.¹⁴⁶ Similarly, floodwater had not entered the Giron home as of 9:47 a.m. on August 28, 2017, the day after Dr. Nairn's model claimed it had.¹⁴⁷ Dr. Nairn's model is simply wrong and is contradicted by the actual events observed at the Micu and Giron properties. As Dr. Bedient testified, correcting Dr. Nairn's three-foot error in peak stage level at Peek Road demonstrates that the Micu and Giron structures were inundated solely by the Harvey pool behind Barker dam—not riverine flooding from Upper Buffalo Bayou or the Willow Fork Diversion Channel.¹⁴⁸

¹⁴³ DX 608 at p. 123 (Figure 5-28: Simulated water surface elevations at the property of Popovici, Catherine (Actual Harvey Run) (“This property did not actually flood above [First Floor Elevation]. The model overestimates the water surface elevations at this property.”); 5 R.R. 1239:1-5 (Popovici).

¹⁴⁴ 7 R.R. 1997:3-1998:5 (Bedient); PX 222 (Barker Reservoir area map depicting Upper Buffalo Bayou (Cane Island Branch), Willow Fork Diversion Channel, Mason Creek, and lateral channels).

¹⁴⁵ DX 608 at Fig. 5-30; DX 608 at Fig. 5-31.

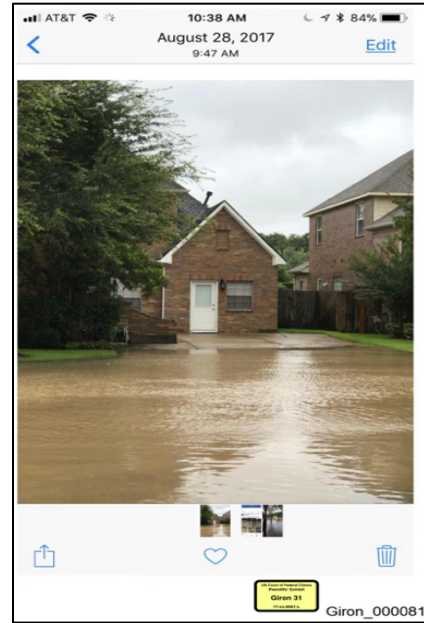
¹⁴⁶ 9 R.R. 2817:20-2818:2; MICU 59.

¹⁴⁷ Giron Ex.1.

¹⁴⁸ 7 R.R. 1999:20-2000:13 (Bedient).



**Figure 1: Micu Driveway,
August 28, 2017 at 9:55 a.m.**



**Figure 1: Giron Property,
August 28, 2017 at 9:47 a.m.**

Dr. Nairn chose to believe his own model—based on a altered source code and cherry-picked rainfall data from Mr. Kappel at AWA—rather than the eyewitness testimony, photographs, and videos taken during the flooding itself, USGS gage data, and rainfall data pertinent to the watersheds and reservoir pooling at issue. The Government even provided Dr. Nairn with deposition excerpts of each Test Property Plaintiff, under oath, discussing the actual depth of stormwater inundation in their homes during Harvey, which he ignored as well.¹⁴⁹

Of course, Dr. Nairn’s decision to completely omit the impact of stormwater drainage systems, which he passed off as “too complicated,” also renders his model results unreliable. For example, an independent model that did include drainage systems concluded that neither Langham or Turkey

¹⁴⁹ DX0608 at p. 97 (Figure 5-2: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072760 on upper Langham Creek).

Creek overtopped prior to being under control of Addicks pool backwater.¹⁵⁰ These conclusions are consistent with USGS gage data, which reflects Langham's maximum flows were only 9,000 cfs during Harvey, or consistent with a 20-year storm.¹⁵¹ Not surprisingly, Dr. Nairn's model overstates Langham Creek elevations.¹⁵² Finally, Dr. Nairn's last-ditch attempts to criticize a USGS gage as unreliable due to a supposed malfunction are directly controverted by USGS testimony, to say nothing of being inconsistent with elementary hydrostatic principles.¹⁵³ Notably, the Government declined to ask Mr. East a single question (or any questions for that matter) about this supposed gage malfunction.

In summary, Dr. Nairn never established a reliable correlation between the projections his model produced and actual results on the ground. Indeed, he fastidiously avoided using real world evidence (e.g. photos, videos, USGS gate data, and independent reports). Accordingly, Dr. Nairn's various "Actual Run" scenario should not be preferred over the actual events, rainfall, and pool levels experienced during Harvey.

4. Dr. Nairn's "No Project" model scenario exaggerates riverine flooding by imposing artificial blockages on channels flowing onto Government-owned land.

The Government next argues that the Burnham, Micu, and Giron Test Properties would have flooded even in the absence of the Project.¹⁵⁴ To reach that conclusion, Dr. Nairn's "No Project"

¹⁵⁰ LOE Ex. 7, Lakes on Eldridge Harvey Flood Response Study, at 23-26 (finding that the flooding in those areas was solely a result of the Addicks dam holding back and controlling stormwater runoff).

¹⁵¹ PX 138, USGS Characterization of Peak Streamflows (2018, USGS 0073463)(showing peak streamflows and annual exceedance probability for USGS 08072760 Langham Creek gage); 8 R.R. 2179:7-2181:17)(East).

¹⁵² DX 608, at 97 (Nairn Report Figure 5-2 and 5-3, Langham Creek 1 and 2); 9 R.R. 2842:21-2843:15 (Nairn testimony conceding that his report overstates Langham Creek elevations).

¹⁵³ 8 R.R. 2173:10-15 (East testimony that USGS gages are regularly inspected, calibrated, and are reliable); 9 R.R. 2801:19-2802:18)(Nairn testimony regarding supposed gage malfunction).

¹⁵⁴ 9 R.R. 2760:16-2761:1 (Nairn); DX0608, Expert Report of Dr. Robert Nairn at 129.

model not only removes the Addicks and Barker dams, but also inexplicably removes the channel improvements constructed on Government-owned land and purports to replace them with conditions as they existed in the 1940s.¹⁵⁵ Thus, Dr. Nairn's No Project model not only removes the Project, but portions of local drainage infrastructure unrelated to the Project (*i.e.*, all channels outside Government-owned land—including Mason Creek, Upper Buffalo Bayou Cane Island Branch, Willow Fork Diversion Channel, Bear Creek, Langham Creek, and Horsepen Creek—remain improved *until* they cross the Government-owned land boundary. At that boundary, Dr. Nairn elevated those channels by 10 to 13 feet so they ceased to exist—literally, the model creates a wall as if the channels simply stop and lead to nowhere. In this unrealistic scenario, those channels would hypothetically remain freely flowing until they hit the “impenetrable wall” at the boundary of the Government-owned land, at which point the flowing water artificially backs up and overflows the channel's banks.¹⁵⁶ These counterfactual, manufactured blockages would thus cause exaggerated riverine flooding for properties impacted by the artificial condition.¹⁵⁷ Of course, the Court should not conflate the real world with an unrealistic theoretical one in deciding these issues. *See Alford v. United States*, 141 Fed. Cl. 421, 426 (2019) (noting that conflating real world facts with a theoretical “never was” world would “turn the Fifth Amendment on its head.”).

The impact of Dr. Nairn's modeling error is clearly demonstrated in his No Project scenario of the Burnham property.¹⁵⁸ First, his No Project Run predicts that the Burnham's water surface elevation at the first flooding peak—early in the morning on August 28, 2017—would be higher than

¹⁵⁵ 9 R.R. 2848:5-17 (Nairn testimony that he partially filled in drainage ditches extending onto Government-owned land based on historical maps from 1918 to the 1950s).

¹⁵⁶ 7 R.R. 2002:17-23; 2004:19-2005:2 (Bedient).

¹⁵⁷ 7 R.R. 2002:17-23; 2004:19-2005:2 (Bedient).

¹⁵⁸ DX 608, Expert Report of Dr. Robert Nairn at 136.

the first peak in the Actual Harvey Run.¹⁵⁹ But simply removing the dams should not increase flood levels then (as Dr. Nairn's model predicts) because at that point the Addick's pool had not risen high enough to have any impact at the Burnham property.¹⁶⁰ In addition, by artificially blocking the passage of water through the tributary nearest the Burnham home (*i.e.*, Langham Creek), Dr. Nairn exaggerates riverine flooding by assuming an invisible wall which blocks all water flowing in the channel and be forced to spill out across the land surface.

This fallacy of using Dr. Nairn's "never was" No Project model is amply illustrated when compared to Dr. Nairn's "No Project II" model, which projects water surface based on the removal of only the Federal Project. As Dr. Nairn admitted, according to his No Project II model, Ms. Burnham's home would not flood if the dams were not in place.¹⁶¹

5. Dr. Nairn's "Gates Open" and "Gates Closed" scenarios are not relevant to any issue in the Upstream case.

Plaintiffs have never claimed that the flooding at issue in this lawsuit was caused by any decision made by the Corps during Harvey, including the decision to release impounded floodwaters.

Instead, Upstream Plaintiffs alleged, and proved at trial, that their Upstream properties flooded during Harvey because they were located in areas which the Government intended to occupy and expropriate with stormwater runoff held back and controlled by the use and mandatory operations of the Project. The Parties agree that the Project's gate operations were in strict accordance with the

¹⁵⁹ DX 608, Expert Report of Dr. Robert Nairn at 136.

¹⁶⁰ 7 R.R. 2005:3-2006:10 (Bedient).

¹⁶¹ PX 3005, Summary Sheet from Dr. Nairn's Downstream model (Downstream BAIRD 0000394.xlsx) (reflecting "No Flooding" for Ms. Burnham's residence); 9 R.R. 2854:21-2858:24 (Nairn testimony admitting that his No Project II model projects no structure flooding in Burnham home).

Water Control Manual.¹⁶² The Parties further agree that the Water Control Manual forbids gate operations that are inconsistent with the Project's authorized public purpose of protecting only Downstream interests. Indeed, the Water Control Manual evidences that Project operations will always utilize available storage (including Plaintiffs' homes and businesses) to the maximum extent possible to prevent the occurrence of damaging flood stages Downstream.¹⁶³ This further shows Plaintiffs' properties are, within the meaning of the *Cress* test,¹⁶⁴ permanently liable to intermittent but inevitably recurring Project-induced flooding.

As such, Dr. Nairn's "Gates Open" and "Gates Closed" scenarios are deviations from that manual that did not occur during Harvey and are simply irrelevant to any issue in the Upstream case because the Corps did not and could not have exercised any "discretion" exercised as to the operation of the gates. All testimony at trial demonstrated that the Government was bound to, and did, follow the Water Control Manual. There were no deviations from the Manual that could have impacted the August 30, 2017 peak reservoir pools.¹⁶⁵ Here again, whatever might have happened in a "never was" world is irrelevant to the issues joined at trial.

¹⁶² U.S. Post-Trial Brief at p. 48-51.

¹⁶³ 1 R.R. 103:2-104:13 (Thomas testimony that the purpose of induced surcharge gate operations was to free up available storage space, to protect the integrity of the Project's structures, but not to "help out the upstream folks").

¹⁶⁴ *United States v. Cress*, 243 U.S. 316, 328 (1917) (holding there is no difference of kind between a permanent condition of continual backwater submersion and a permanent liability to intermittent but inevitably recurring submersion).

¹⁶⁵ 1 R.R. 178:16-179:1 (Thomas testimony that post August 30th drawdown plans had no effect on maximum reservoir pool elevations).

B. The Government's Attacks on Dr. Bedient's Methodology and Conclusions are Without Merit.

The Government offers an anemic, unavailing attack of Dr. Bedient's analysis. First, the Government complains that Plaintiffs offered no numerical modeling at trial. Actually this is not true. While Dr. Bedient did not develop his own numerical model for this case, like Dr. Nairn did, Dr. Bedient did utilize the latest numerical modeling and results developed by the federal government (FEMA) for evaluating the riverine flooding associated with Harvey. Furthermore, as Dr. Bedient testified, numerical modelling may be useful to study *hypothetical* conditions, provided the model is accurately calibrated and compared against gage readings.¹⁶⁶ Dr. Bedient was tasked with determining the *actual* cause of flooding of Upstream Test Properties in connection with the Harvey event.¹⁶⁷ By use of the FEMA modeling results and relying on actual data, observations, photographs and other evidence, Dr. Bedient was able to provide highly reliable opinions as to the cause of the Plaintiffs' flooding. The Government does not and cannot point to any evidence that numerical modeling is necessary for that purpose.

Second, the Government claims Dr. Bedient failed to consider cumulative rainfall impacts and pluvial flooding near the Test Properties in his analysis of riverine flooding.¹⁶⁸ Not so. Dr. Bedient's report includes an extensive section regarding other possible sources of flooding, including pluvial flooding (*i.e.*, flooding occurring from engineered drainage systems being overwhelmed).¹⁶⁹ Dr. Bedient used the latest FEMA 100-year and 500-year flood profiles for the major creeks and bayous near the Test Properties to identify FEMA's 100-year, 500-year and Harvey flood elevations at each of the

¹⁶⁶ 7 R.R. 2036 21-2037:1 (Bedient).

¹⁶⁷ PX0 26, Expert Report of Dr. Philip Bedient at 1-2.

¹⁶⁸ U.S. Post-Trial Brief at 72-73.

¹⁶⁹ PX 526, Expert Report of Dr. Philip Bedient at 47-54.

stream gages along those same creeks and bayous.¹⁷⁰ As Dr. Bedient explained in his expert report, the critical duration of rainfall that is applicable to these creeks and bayous is normally in the 6 to 12 hour timeframe.¹⁷¹ In fact, the Corps itself found that the travel time for peak rainfall to drain in the Addicks and Barker watersheds and into these reservoirs is on the order of 5 to 13 hours.¹⁷²

Accordingly, Dr. Bedient and his team looked at the maximum rainfall amounts over the watersheds for the 6- and 12-hour durations to determine if there was sufficient intensity of rainfall to indicate pluvial flooding.¹⁷³ The data demonstrates that the rainfall over the Addicks and Barker watersheds would produce flood levels in some of the creeks consistent with a 100- or 500-year event for those durations.¹⁷⁴ These results were consistent with the flood levels recorded at the various USGS stream gages in these watersheds during Harvey. Thus, cumulative rainfall impacts were accounted for in Dr. Bedient's riverine flood analysis.

Dr. Bedient and his team also looked at the available stream gage data and high-water marks, and reviewed the FEMA flood data of the relevant creeks in order to estimate Harvey flood levels along those creeks.¹⁷⁵ Dr. Bedient then used linear extrapolation to provide a reasonable estimate of the riverine flood level at each of the Test Properties.¹⁷⁶ This methodology allowed him to compare

¹⁷⁰ PX 2296, Bedient Appendix D-1, Table 14-1; 7 R.R. 1978:8-22.

¹⁷¹ PX 526, Expert Report of Dr. Philip Bedient at 48-49.

¹⁷² PX 526, Expert Report of Dr. Philip Bedient at 48-49.

¹⁷³ PX 526, Expert Report of Dr. Philip Bedient at 49.

¹⁷⁴ PX 526, Expert Report of Dr. Philip Bedient at 50-52.

¹⁷⁵ 7 R.R. 1923:13-22; PX 526, Expert Report of Dr. Philip Bedient at 52.

¹⁷⁶ 7 R.R. 1980:10-1981:16. For Langham Creek, Dr. Bedient also used the high water marks for the 2016 Tax Day event obtained from the Harris County Flood Control District to inform a more up-to-date and accurate flood profile for his linear extrapolation. 7 R.R. 1981:17-1982:4. And for the

the water levels in the relevant creeks at nearby gages with the levels of the creeks near the Plaintiffs' properties to see if those creeks were out of banks at the Plaintiffs' locations.¹⁷⁷

Finally, and unlike Dr. Nairn, Dr. Bedient also considered eyewitness testimony, photographs, and videos of the pertinent water courses.¹⁷⁸ Based on this robust evidence and sound methodology, Dr. Bedient ultimately concluded that riverine flooding was not a cause of any of the Plaintiffs' flood damages.

Third, the Government contends that Dr. Bedient's slab elevation adjustment of 0.3 feet is "unclear." Dr. Bedient compared each Test Property Plaintiff's first floor/slab elevation to their respective maximum pool elevation to determine if the pools caused the structural flooding of each Test Property. During this process, it became clear that some of the slab elevations were incompatible with the actual Harvey pool based on both eyewitness observations and USGS pool readings. For example, the Wind residence impounded one to two inches of water during Harvey on August 30, 2017 that clearly was from the Addicks reservoir pool, but the surveyed slab elevation of that structure was determined to be at an elevation of 109.3 feet—two inches above the Harvey pool according to the USGS gage data.¹⁷⁹ Similarly, the survey elevation of the Popovici residence suggests that structure was 0.7 feet above the maximum Barker reservoir pool, but eyewitness testimony and photographic evidence indicates that the pool only rose to about 4 inches from entering the Popovici home.¹⁸⁰ To

Lakes on Eldridge property, Dr. Bedient relied on the AECOM study to estimate the Harvey flood-plain level for that Test Property of less than 107 feet. 7 R.R. 1982:15-16.

¹⁷⁷ 7 R.R. 1925:17-1926:23; PX 526, Expert Report of Dr. Philip Bedient at 54.

¹⁷⁸ 7 R.R. 1919:16-1920:1; 7 R.R. 2104:25-2105:10.

¹⁷⁹ 7 R.R. 1945:8-1946:5 (Bedient).

¹⁸⁰ 7 R.R. 1945:8-1946:5 (Bedient).

square USGS recorded pool elevations based on one benchmark with the survey data that used different benchmarks, Dr. Bedient adjusted the slab elevations by 0.3 feet (3.6 inches) just when comparing these slab elevations with these pool elevations. With these small adjustments, the difference between the surveyed slab elevations and Harvey pool level matched the actual, observed conditions at the test properties.¹⁸¹ These same adjustments were not needed when comparing the flood levels from the FEMA flood profiles to the Plaintiffs' slab elevations because the benchmarks used for both were the FEMA benchmarks.

Next, the Government takes issue with the methodology by which Dr. Bedient concluded that the Burnham property was free from riverine flooding during Harvey. Dr. Bedient testified that he used FEMA flood insurance profiles to identify the tributary nearest each Test Property, and then via linear interpolation, calculated the tributary's water surface elevation during Harvey and compared that to the property's slab elevation.¹⁸² Where the slab elevation is above the calculated water surface elevation, riverine flooding could not have caused the structure flooding for that particular test property.¹⁸³ Therefore, Dr. Bedient excluded riverine flooding as the cause of each Upstream Test Property's submersion during Harvey.¹⁸⁴

¹⁸¹ 7 R.R. 2044:14-18 (Bedient) ("But the adjustment was made because of the observational information between the Wind property and the Popovici property, and the 0.3 allows those to line up with direct observation with the USGS information.").

¹⁸² PX 2296, Bedient Appendix D-1 at 3, Table 15-1.

¹⁸³ 7 R.R. 1984:11-20 (Bedient).

¹⁸⁴ With the exception of the West Houston Airport Corporation (WHAC) property, each test property's slab elevations sits above the calculated Harvey tributary elevation. WHAC is both a larger piece of property and immediately adjacent to Bear Creek, which did not have a single tributary elevation next to the property during Harvey. However, a high bank extends the length of Bear Creek and would contain the tributary at its Harvey elevation, even though the WHAC slab might be lower than the water passing by at the moment. 7 R.R. 1985:17-1988:18 (Bedient).

The Government argues that Dr. Bedient erred in using the Tax Day profile of Langham Creek in his analysis of the Burnham property.¹⁸⁵ As Dr. Bedient testified at trial, it was appropriate to use the Tax Day profile for the Burnham property for two reasons: (1) the Tax Day profile was the most recent flood profile for Langham Creek, and (2) Tax Day flood levels exceeded Harvey flood levels at that location.¹⁸⁶ As a result, the Tax Day profile, if anything, overestimates the relative magnitude of riverine flooding at the Burnham property.¹⁸⁷

The Government also alleges that Dr. Bedient changed his methodology with respect to the Burnham property.¹⁸⁸ As the Court has already determined, this is not the case.¹⁸⁹ Dr. Bedient made minor corrections to the base numbers in Appendix D of his original expert report, but his methodology, analysis and opinions with respect to riverine flooding at the Burnham property have remained consistent throughout this litigation.¹⁹⁰ He testified that the amended Appendix D-1 does not include any additional information, but rather corrects base data from Harris County that had been updated since his original expert report was issued.¹⁹¹ As the Court has already determined, Appendix D-1 is

¹⁸⁵ U.S. Post-Trial Brief at 88.

¹⁸⁶ 7 R.R. 1924:2-14; 7 R.R. 1981:24-1982:4 (Bedient).

¹⁸⁷ 7 R.R. 1924:2-14; 7 R.R. 1981:24-1982:4 (Bedient).

¹⁸⁸ U.S. Post-Trial Brief at 89.

¹⁸⁹ 7 R.R. 1977:23-25.

¹⁹⁰ PX 2296, Bedient Appendix D-1 at 6; 7 R.R. 1929:7-12 (explaining that his analysis of riverine flooding conditions at the Burnham property did not change); 7 R.R. 1926:24-1927:3; 7 R.R. 1976:13-14 (“Actually, the numbers changed slightly, but none of the opinions have changed.”); 7 R.R. 1977:7-11 (Q: So if I walk through this new—if I walk through the report that you prepared, you—you used the exact same methodology as you described to me during the deposition? A: Yes.) (Bedient).

¹⁹¹ 7 R.R. 1970:23-1971:2; 7 R.R. 1970:18-19; 7 R.R. 1970:6-7 (corrected a typographical error); 7 R.R. 1970:18-19 (“We wanted to use the latest and most accurate numbers.”) (Bedient).

“a pure correction based on data obtained from Harris County that was itself a correction.”¹⁹² Plaintiffs produced Appendix D-1 immediately after Dr. Bedient realized a correction was necessary.¹⁹³ As to the Burnham property, the Langham Creek results are the same in Dr. Bedient’s original report and in his amended Appendix D and Table 15-1, since the methodology was the same.

Finally, the Government erroneously contends that Dr. Bedient “reversed course” with respect to the Harvey Floodplain Elevation of the Burnham property.¹⁹⁴ Dr. Bedient’s original expert report lists the house/building slab elevation of the Burnham property at 105.4 feet and the Harvey Floodplain Elevation at 104.5 feet.¹⁹⁵ As discussed above, the Harvey Floodplain Elevation figure for the Burnham property is based on the Tax Day profile of Langham Creek, 104.5 feet. Dr. Bedient testified that the floodplain elevation figure using FEMA’s standard profile would be 105.4 feet (the same elevation as the Burnham slab).¹⁹⁶ But because Dr. Bedient determined that the Tax Day profile provided the most accurate floodplain elevation for the Burnham property, he used the 104.5-foot elevation throughout this litigation.¹⁹⁷

At the end of the day, none of the Government’s criticisms of Dr. Bedient’s analysis have any merit. His conclusions presented in Table 15-1 of his expert report proves that none of the Test Properties had structural flooding due to riverine flooding, nor would they have had such flooding

¹⁹² 7 R.R. 1977:23-25.

¹⁹³ 7 R.R. 1968:14-1969:4 (Bedient).

¹⁹⁴ U.S. Post-Trial Brief at 89.

¹⁹⁵ PX 526, Expert Report of Dr. Philip Bedient at 54, Table 15.

¹⁹⁶ 7 R.R. 2080:6-10 (Bedient).

¹⁹⁷ 7 R.R. 2080:15-17 (“Q: So the number you had in your original report was the correct number? A: Yes.”) (Bedient).

“but for” the Addicks and Barker dams, with the exception of the West Houston airport.¹⁹⁸ And as regards the West Houston Airport Corporation property, even though the estimated Harvey flood-plain level was higher than portions of the WHAC airport property, record evidence proves that Bear Creek never overtopped its south bank to cause any flooding on the WHAC property.¹⁹⁹ Finally, Dr. Nairn’s analysis confirms that the WHAC had no flooding from Bear Creek and only from the reservoir pool.²⁰⁰ Thus, as Dr. Bedient concluded: “None of the test properties’ structures would have flooded but for the impoundment of rainfall runoff waters behind Addicks and Barker Dams. Popovici did not have any flooding within the home during Harvey but would not have had any flooding on her property but for the impoundment behind Barker Dam.”²⁰¹ Each Test Plaintiff’s property was flooded solely by the stormwater runoff impounded in the reservoir pools of the Government’s flood-control project.

C. William Kappel’s Methodology, Data, and Conclusions as to the “Rarity” of a Storm like Harvey are Deficient.

The Government relies on Mr. Kappel’s testimony for establishing the size and rarity of the Harvey storm event, in its argument that this was an “unprecedented” storm event.

Mr. Kappel’s methodology is deficient for various reasons. First, as to his estimate of the Harvey rainfall itself, Kappel and AWA cherry-picked rainfall data from *only four* of the 154 Harris

¹⁹⁸ 7 R.R. 1983:14-1984:25; PX 2296, Expert Report of Dr. Philip Bedient at Appx. D-1, Table 15-1.

¹⁹⁹ 7 R.R. 1987:5-1988:5; Lesikar 1-A (August 28, 2017 photograph of Bear Creek Diversion Channel); Lesikar 1-J (August 28, 2017 photograph of Bear Creek Diversion Channel); Lesikar 3 (August 28, 2017 video of Bear Creek Division Channel.)

²⁰⁰ 7 R.R. 1989:15-1990:15.

²⁰¹ PX 526, Expert Report of Dr. Philip Bedient at 7-8 (November 5, 2018).

County rain gages,²⁰² none of which was located within the operative watersheds.²⁰³ Kappel's inclusion of data from the Clear Lake Gage, which received the maximum recorded amount of rainfall *in the entire county* and is roughly 40 miles away from the Project, is illustrative of his results-oriented approach.²⁰⁴ In fact, Kappel's rainfall accumulation estimates are, at times, 100 percent different than the observed rain gage data.²⁰⁵ In addition, Kappel's study area encompassed 1,834 square miles, even though the Upper Buffalo Bayou watershed is ~400 square miles.²⁰⁶

Next, Kappel used a proprietary software system called SPAS to reach his ultimate conclusion that the annual exceedance probability of a storm like Harvey revisiting the basin (*i.e.*, the 1,834 square mile focus area) ranged from 75 years to 4,190 years.²⁰⁷ Tellingly, Kappel admitted that the results of the SPAS model are "inherently uncertain" because the model relies on the accuracy or completeness of the underlying data.²⁰⁸

Second, his frequency estimates are outdated at least inasmuch as Kappel elected to ignore changing in precipitation conditions over time.²⁰⁹ For example, Kappel admitted he ignored NOAA's

²⁰² 5 R.R. 1187:20-23 (Kappel).

²⁰³ 5 R.R. 1187:24-1188:6 (Kappel).

²⁰⁴ 5 R.R. 1191:23-1192:16 (Kappel).

²⁰⁵ 5 R.R. 1181:7-10 (Kappel).

²⁰⁶ 5 R.R. 1144:8-1145:17; 5 R.R. 1187:4-9 (Kappel).

²⁰⁷ DX 601 (as admitted) at 195.

²⁰⁸ 5 R.R. 1180:20-1181:1 (Kappel) ("We cannot guarantee that accuracy or completeness of the input weather radar data, so the results inherently carry a degree of uncertainty.").

²⁰⁹ 5 R.R. 1202:13-1204:4 (Kappel).

most recent Point Precipitation Frequency Estimates, which drastically change exceedance probabilities (*i.e.*, in Houston, 100-year storms are now 25-year storms).²¹⁰ Kappel stated he had no opinions on climate change, and previously admitted his report did not account for climate change.²¹¹ Nor did Kappel account for the increasing frequency and severity of storms in the Houston area,²¹² despite the fact that the Government acknowledges that “unexpected changes in weather patterns [have] brought larger and more extreme storms to the area.”²¹³ Indeed, Kappel admitted that SPAS algorithms do not take into account changing precipitation conditions over time (*i.e.*, SPAS does not assign any weight to the four massive storms that have hit the Houston area since Memorial Day 2015).²¹⁴

Mr. Kappel apparently did not have access to the late-produced document from 1938 which estimated that a “rainfall of 35.1 inches in 104 hours ... is considered as likely to occur within a frequency of once every 50 years.”²¹⁵ The Corps’ own document undercuts Mr. Kappel’s frequency analysis.

Still, Mr. Kappel did admit that he agrees with Plaintiffs that a rain event similar to Harvey will occur again over the Addicks and Barker watersheds.²¹⁶ This should not be if Harvey was such a rare

²¹⁰ 5 R.R. 1197:1-20; PX 2293-2295 (NOAA Atlas 14, Volume 11, Version 2 Point Precipitation Frequency Estimates for Addicks and Barker areas).

²¹¹ 5 R.R. 1207:20-1208:20.

²¹² 5 R.R. 1212:2-17.

²¹³ U.S. Post-Trial Brief at ii.

²¹⁴ 5 R.R. 1203:8-1204:3.

²¹⁵ *See* Ex. A to Plaintiffs’ Motion to Reopen Trial Record (ECF No. 245-1), Report on Review of Plans for Proposed Buffalo Bayou Flood Control (April 6, 1938, USACE2019_0000014).

²¹⁶ 5 R.R. 1198:4-8 (Kappel).

event as Mr. Kappel opined. He also conceded that Harvey's maximum five-day rainfall into the watersheds was not unprecedented for Harris County.²¹⁷ With these opinions, Plaintiffs can agree since both are completely consistent with the Government's own studies and documents and do not rely on acceptance of Kappel's flawed analyses.

In summary, the amount of rain associated with Harvey over the Addicks and Barker Watersheds was not "unprecedented" to the Houston area, was not so rare that it will not happen again, and was not unanticipated, unexpected or unforeseen.

D. Andrew Ickert's Opinions on Land Use Changes Ignores Several Potential Causes of Higher Pool Elevations.

Mr. Ickert's opinions related to land use changes in the Addicks and Barker watersheds from the 1940s to present, although he skipped 1980-1989.²¹⁸ He testified that changed land use in the Addicks and Barker watersheds could be one of several potential causes of recently observed higher pool elevations in the Addicks and Barker reservoirs, but he failed to consider any of those other potential causes.²¹⁹ For instance, Mr. Ickert testified that increased rainfall, changes to the operations of the dams, and modifications to the dams themselves could cause higher pool elevations.²²⁰ However, he failed to consider any of these factors in his qualitative analysis.

Further, Mr. Ickert learned at trial, apparently for the first time, that as a condition of developing land in Harris and Fort Bend counties, developers are prohibited from causing any adverse

²¹⁷ 5 R.R. 1199:21-1200:7 (Kappel).

²¹⁸ 10 R.R. 3115:7-9.

²¹⁹ 10 R.R. 3111:8-11 (Q: Other things could lead to having a higher pool level other than this land use change you've been talking about; correct? A: Yes.) (Ickert).

²²⁰ 10 R.R. 3111:8-3112:5 (Ickert).

impact, *i.e.* increased runoff, as a result of the new development.²²¹ Again, Mr. Ickert's analysis wholly ignores this important "no adverse impact" policy, and instead he assumed that such upstream development would cause increased runoff that have led to increased reservoir pool levels during the last 20-25 years. He also failed to investigate whether any land use changes or development conformed with applicable building codes or regulations governing drainage impacts.²²² These omissions alone render Mr. Ickert's opinions unreliable.

In addition, Mr. Ickert omitted an entire decade, the 1980s, which is significant as the 1980s were critical in the land use history of the Addicks and Barker reservoirs. In 1981, the Corps dramatically changed its land use policies to allow for improved channels to enter Government-owned land, as long as these channels restricted inflows to 1979 existing conditions.²²³ In fact, the Corps received compensation in exchange for allowing landowners to build those improved channels.²²⁴ Mr. Ickert was unaware of these pertinent facts before trial.²²⁵ Then, in 1987, the Corps granted permission for improving the Willow Fork, Mason Creek, Bear Creek, and Horsepen-Langham diversion channels

²²¹ 10 R.R. 3110:25-3111:6; 3111:106 (Q: You're not familiar with this no-adverse-impact policy. Yes? A: I'm not familiar, that's correct. Q: So you did not include the no-adverse-impact policy in your expert analysis. Yes? Q: Yes.); 3124:6-7 ("Again, I'm just not familiar with the no-adverse-impact policy.") (Ickert).

²²² 10 R.R. 3114:20-3115:6 (Ickert).

²²³ 10 R.R. 3115:7-19; 10 R.R. 3121:20-3122:2 (Ickert); *see also* JX 52, Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addicks and Barker Reservoirs, Houston, Texas (October 1995, USACE 015144) (describing Corp's 1979 existing conditions policy).

²²⁴ 10 R.R. 3121:20-3122:6 (Ickert).

²²⁵ 10 R.R. 3121:25-3122:6 (Ickert).

by extending each onto government-owned land in the reservoirs.²²⁶ Mr. Ickert failed to conduct any analysis or modeling of the impact of those incoming tributaries draining into the reservoirs.²²⁷

Plaintiffs take no issue with the fact that there has been substantial development in the greater Houston area since the 1940s. Indeed, PDX 15 (video compilation of historical Google Earth images), shows this to be true. However, Mr. Ickert's methodology and actual opinions do not support an argument that increased development in the Upper Buffalo Bayou watersheds has caused a quantifiable increase in runoff inflows.

E. David Hooper's Hypothetical Scopes of Repair Work are Irrelevant, Unreliable, and Speculative.

Mr. Hooper and Jean-Prieur Du Plessis of Madsen Kneppers & Associates were hired by the Government to create hypothetical scopes of work that would be required to repair five upstream test properties following the damage they suffered from the Government's flooding.²²⁸ Why this analysis was performed or presented at trial remains a mystery since the question of as assesses the scope of rights lost, not the quantum of damage incurred. *Ridge Line*, 346 F.3d at 1356 (noting that the "invasion preempted the owner's right to enjoy his property for an extended period time, rather than merely inflict an injury that reduces its value"); *see also Big Oak Farms, Inc. v. United States*, 105 Fed. Cl. 48, 53 (2012) ("It is the character of the invasion, not the amount of damage resulting from it, so long as the damage is substantial, that determines the question whether it is a taking." citation omitted); *Arkansas Game & Fish*, 736 F.3d at 1370 (stating that the question is "whether the injury constituted a sufficiently severe invasion that interfered with the landowner's reasonable expectations as to the use of

²²⁶ 10 R.R. 3120:12-3121:16 (Ickert); PDX 15 (video from Google Earth).

²²⁷ 10 R.R. 3121:17-19; 10 R.R. 3122:7-20 (Ickert).

²²⁸ 9 R.R. 2875:19-24 (Hooper).

their property”). Even if Mr. Hooper and Mr. Du Plessis’s opinions were relevant to question of the Government’s liability, they are unreliable, speculative, and subjective.

Mr. Hooper and Mr. Du Plessis reached no opinions regarding the properties belonging to Popovici, Soares, Holland, Lakes on Eldridge, West Houston Airport Corporation, Banker, Stewart, or Wind.²²⁹ With respect to the few Test Properties they did consider, they reached no opinions regarding damage to any property’s foundation, driveway, landscaping, or structure, including brickwork or framing.²³⁰ None of their opinions relate to the personal property that was destroyed by impounded stormwater runoff and resulting mold growth.²³¹

Mr. Hooper’s testimony ultimately supports Plaintiffs’ position that the Project-induced invasion severely interfered with Plaintiffs’ customary use of their respective properties.²³² For instance, Mr. Hooper concedes that the Burnham, Giron, Micu, Sidhu, and Turney properties were each inundated during Harvey by grossly contaminated Category 3 “black” floodwater,²³³ which has greater potential to harbor pathogens, including sewage, chemicals, fertilizer, and organic material, than any other type of floodwater.²³⁴ As a result, all appliances, electrical components, and moisture-sensitive materials like carpet, drywall, and insulation that are wetted with Category 3 floodwater suffer permanently damage as they must be removed, disposed of, and replaced.²³⁵ As Mr. Hooper testified, any

²²⁹ 9 R.R. 2926:10-20 (Hooper).

²³⁰ 9 R.R. 2898:6-8; 2928:4-15 (Hooper).

²³¹ 9 R.R. 2928:16-20 (Hooper).

²³² Mr. Du Plessis did not testify at trial.

²³³ 9 R.R. 2934:7-11; 9 R.R. 2892:12-20 (Hooper).

²³⁴ 9 R.R. 2892:21-24; 2933:22-2934:1 (Hooper).

²³⁵ 9 R.R. 2898:2-22; 9 R.R. 2892:25-2893:6 (Hooper).

property that could be salvaged would have to be cleaned and treated with an antimicrobial, because Category 3 black floodwater requires additional cleaning practices or demolition within a structure.²³⁶

Mr. Hooper also conceded that all five Test Properties in his analysis were flooded for sufficient duration to support mold growth.²³⁷ He agrees with Plaintiffs that there was sufficient humidity inside each property's structure to sustain and amplify mold growth, and that wicking can cause mold to grow higher than the maximum flood line.²³⁸ Finally, Mr. Hooper agrees with Plaintiffs that his No Project and Gates Open scenarios are purely hypothetical because the Projects exist and the Corps did not leave the gates open during Harvey.²³⁹

While Mr. Hooper and Mr. Du Plessis ultimately agree with Plaintiffs on these key points, their remaining methodology and opinions do not support the conclusion that Plaintiffs would have suffered the same damage if there was no Project. First, their hypothetical scopes of repair work rely on exactly two variables: floodwater depth and duration of flooding inside five Test Property structures,²⁴⁰ which Dr. Nairn supplied.²⁴¹ For the reasons discussed above, Dr. Nairn's data is demonstrably incorrect and therefore unreliable and, accordingly, Mr. Hooper and Mr. Du Plessis's opinions suffer from those same deficiencies. *See St. Bernard Parish Government v. United States*, 126 Fed. Cl. 707, 719 (2016) (Braden, J.) (“[T]he court has determined that Mr. Du Plessis's testimony was unreliable, subjective, and speculative” because his opinions relied on deficient data).

²³⁶ 9 R.R. 2934:2-6 (Hooper).

²³⁷ 9 R.R. 2934:12-16 (Hooper).

²³⁸ 9 R.R. 2934:17-19; 9 R.R. 2934:20-2935:10 (Hooper).

²³⁹ 9 R.R. 2926:24-2928:3 (Hooper).

²⁴⁰ 9 R.R. 2929:10-13 (Hooper).

²⁴¹ 9 R.R. 2928:21-24; 9 R.R. 2885:17-2886:9 (Hooper).

Mr. Hooper's testimony is unreliable for numerous other reasons. First, Mr. Hooper and Mr. Du Plessis ignored all other sources of depth and duration data, including eyewitness testimony, photographs of actual flooding conditions at the Test Properties during Harvey, Plaintiffs' deposition testimony, and other discovery produced in this litigation.²⁴² They even ignored high-water mark measurements and photographs taken by Mr. Du Plessis and another MKA associate during a site visit to the five Test Properties in their analysis.²⁴³

Further, Mr. Hooper and Mr. Du Plessis rely on several invalid assumptions. For instance, they assumed—incorrectly and without any supporting evidence—that the Test Property owners encountered no delays in stabilizing or drying their structures immediately after the duration of flooding.²⁴⁴ They also assumed the Test Property owners would be able to run engineering controls, like dehumidifiers or air conditioners, immediately after the stormwaters receded.²⁴⁵ But Mr. Hooper and Mr. Du Plessis did not consider whether any Test Property had electricity immediately following the flooding, which would be required to power those engineering controls.²⁴⁶ Mr. Hooper admitted that if their assumptions were wrong and the properties were not immediately stabilized following flooding, then the damage to the structures would be worse due to mold growth.²⁴⁷

Finally, Mr. Hooper testified that determining the appropriate scope of repairs necessary at the Burnham, Giron, Micu, Sidhu, and Turney properties required additional specific knowledge of

²⁴² 9 R.R. 2886:10-12; 9 R.R. 2929:14-19 (Hooper).

²⁴³ 9 R.R. 2930:22-2931:7; 9 R.R. 2932:23-2933:8 (Hooper).

²⁴⁴ 9 R.R. 2896:5-9; 9 R.R. 2935:11-25 (Hooper).

²⁴⁵ 9 R.R. 2936:1-5 (Hooper).

²⁴⁶ 9 R.R. 2936:6-9 (Hooper).

²⁴⁷ 9 R.R. 2896:19-22 (Hooper).

the condition of each property prior to Harvey and the impacts of Harvey on individual finishes within the property.²⁴⁸ But Mr. Hooper and Mr. Du Plessis took no steps to determine the condition of any Test Property before Harvey.²⁴⁹ before Harvey.²⁵⁰ They similarly failed to consider any actual repairs made to any Test Property.²⁵¹ For all these reasons, aside from amply demonstrating the severity of interference associated with having one's home invaded by toxic floodwaters, Mr. Hooper's opinions are unreliable, speculative, and subjective.

III. THE INUNDATION OF PLAINTIFFS' PROPERTY WITH STORMWATER RETAINED BEHIND THE ADDICKS AND BARKER DAMS CONSTITUTED A FIFTH AMENDMENT TAKING OF PLAINTIFFS' PROPERTIES.

The record in this matter confirms the severe burden placed on the property interests of the Upstream Plaintiffs caused by the federal public flood control project implemented having the sole purpose of protecting downtown Houston and the Houston Ship Channel: a quintessential takings claim. The amount of stormwater retained and the size of the reservoir pools behind each dam were planned for from the original construction of the Project, enhanced by each modification to the dams, and mandated by the dictates of the compulsory operational edicts of the Corps' Water Control Manual.²⁵² The Government does not get one free flood of private property which lies below the design water impoundment contour line of a flood control dam.

²⁴⁸ 9 R.R. 2932:7-14 (Hooper); DX 602 at 4.

²⁴⁹ 9 R.R. 2932:15-18 (Hooper).

²⁵⁰ 9 R.R. 2932:15-18 (Hooper).

²⁵¹ 9 R.R. 2932:19-22 (Hooper).

²⁵² As the Government's own expert confirmed, the maximum inundation of each Plaintiffs' property was caused by the impoundment of stormwater runoff behind the Addicks and Barker dams—a fact

A. Each Test Plaintiffs' Property was Taken by Government Action.

The record confirms each of the three parts of the *Ridge Line* analysis: (1) the effects each Plaintiff experienced was the predictable result of governmental action, (2) the government's actions were sufficiently substantial to justify a takings remedy; and (3) each Plaintiff possessed a protectable property interest in what it alleges the government has taken. *Ridge Line, Inc. v. United States*, 346 F.3d 1346, 1355 (Fed. Cir. 2003).

1. The flooding of each Test Property was caused by the design, construction, and operation of the Project.

The flooding of private property behind a dam has long been recognized to constitute a taking. *See Pumpelly v. Green Bay Co.*, 80 U.S. (13 Wall.) 166, 181 (1872) (flooding of upstream land behind a dam was a taking); *United States v. Dickinson*, 331 U.S. 745, 751 (1947) (taking found based on “an easement for intermittent flooding of land above the new permanent level” of a reservoir); *Stockton v. United States*, 214 Ct. Cl. 506, 519 (1977) (finding a taking where reservoir behind government dam flooded private land); *see also Harris Cty. Flood Control Dist. v. Kerr*, 499 S.W.3d 793, 807 (Tex. 2016) (“when a government builds a flood-control dam knowing that certain properties will be flooded by the resulting reservoir[,] ... of course the government must compensate the owners who lose their land to the reservoir”). Here, the Test Properties are all located within the reservoirs’ designed impoundment boundaries; thus the inundation of those properties was—by definition—the predictable result of the design, construction, and operation of the Government’s flood-control Project. *Hansen v. United States*, 65 Fed. Cl. 76, 114 (2005) (taking is “foreseeable” if it is the direct, natural or probable result of the alleged governmental-authorized actions for a public purpose”). As this Court has previously noted, cases involving inundation of private property within a federal flood control reservoir are

which the Government has admitted proves causation. U.S. Downstream MSJ at 23 (“Proof of causation in a flooding case requires plaintiffs to show that their properties experienced more flooding than they would have experienced absent government action addressing the relevant risk.”).

somewhat rare since “engineers do not often fail ... to acquire all the land below the contour line of the designed and intended pool.” *Stockton*, 214 Ct. Cl. at 519.

As noted above, the Government has acknowledged that causation is shown by proof that “Plaintiffs’ properties would have experienced less flooding during Hurricane Harvey if the Project had not been built.”²⁵³ That is precisely what the Government’s own expert, Dr. Robert Nairn, admitted was the case; he acknowledged that the maximum inundation of every Test Property was caused by stormwater runoff retained behind the Addicks or Barker dam—and further that the flood pool reservoirs created by the dams were the sole cause of the flooding in ten of the thirteen test properties. As discussed above, the model upon which Dr. Nairn based his belief that riverine flooding contributed to the inundation of Ms. Micu, Mr. Giron, and Ms. Burnham cannot be reconciled with the record evidence showing actual facts experienced by those plaintiffs during and after Harvey. Dr. Nairn’s only challenge to any causation issue was his “predictive modeling” suggestion that riverine flooding contributed to the inundation of the remaining three Test Properties (Micu, Giron, and Burnham), but it is unreliable and contrary to the actual conditions during Harvey.

In addition, Plaintiffs’ expert Dr. Philip Bedient testified that the sole cause of the flooding of each Test Property was the design, construction, and operation of the Project. In contrast to Dr. Nairn’s approach, Dr. Bedient based his opinion on the actual data recorded by unchallenged sources, including evidence regarding flood pool levels at each reservoir and the measured elevations of each Test Property.

²⁵³ U.S. Downstream MSJ at 2, 23; *see also Sponenbarger*, 308 U.S. at 266.

2. The Government does not get one free flood of private property which lies upstream of and within the impoundment contour line of a flood control dam.

Using dicta from inapposite cases involving, *inter alia*, the flooding of properties *downstream* of a flood-control dam, the Government asks this Court to adopt a bright line rule that unless a property is flooded multiple times, there can be no taking.²⁵⁴ Such a rule has no support in takings jurisprudence and such bright line tests have been consistently rejected by federal courts.

“Taking claims must be decided on the particular facts of each case.” *Herriman v. United States*, 8 Cl. Ct. 411, 417 (1985). And while multiple flood events of a downstream property can inform the question of whether such flooding was foreseeable, it is not a dispositive factor in a case where the flooded property lies within the reservoir the government’s dam was designed to create. As the court in *Stockton v. United States*, 214 Ct. Cl. 506, 518-19 (1977) (emphasis added) explained:

We further believe that only one actual flooding is enough when the property is upstream of the dam and below the contour line to which the dam is designed to impound water. Then, even if there has been but one flooding, the result is only that which the engineers intended the dam to achieve. Cases saying that “one flooding does not constitute a taking,” *Hartwig v. United States*, 202 Ct. Cl. 801, 809 (1973) and cases therein cited, are cases where the property flooded is downstream of the dam and the damage is an unintended and unwanted result of changes effected by the dam in the downstream flow or consequential and indirect upstream flooding. Cases such as we have here do not often occur because the engineers do not often fail, as here, to acquire all the land below the contour line of the designed and intended pool.

Project-induced flooding within a dam’s maximum design pool is “‘reasonably to be anticipated by the government.’” *Ridge Line*, 346 F.3d at 1356 (quoting *Sanguinetti v. United States*, 264 U.S. 146, 150 (1924)); *see also* *Portsmouth Harbor Land & Hotel Co. v. United States*, 260 U.S. 327, 329 (1922) (government’s erection of artillery guns “with the admitted intent to fire across the claimants’ land at will,” can effect a taking with the firing of a single shot); *Quebedeaux v. United States*, 112 Fed. Cl. 317, 323-24 (2013) (periodicity of flooding from a government project is only one indication of “whether

²⁵⁴ *See* U.S. Post-Trial Brief at 86-87.

defendant has appropriated an interest for itself in the affected property” by subjecting the property to “a permanent liability to intermittent but inevitably recurring overflows”).

The Government’s “free flood” argument echoes one explicitly rejected in *Quebedeaux*, 112 Fed. Cl. at 324-25-34 (citations omitted):

[The] multi-factored, factually-intensive nature of the takings analysis is well-evidenced in the Supreme Court’s recent opinion in *Arkansas Game & Fish*. In that case, the Court reversed a Federal Circuit decision holding that a government-induced flooding, temporary in duration, gains an automatic exemption from Takings Clause inspection. The Court rejected this bright-line rule because it viewed the determination of whether a flood results in a takings as a case-specific, factual inquiry, emphasizing that “[f]looding cases, like other takings cases, should be assessed with reference to the ‘particular circumstances of each case,’ and not by resorting to blanket exclusionary rules. ... A similar approach to the takings analysis is reflected in flooding cases like *Ridge Line*, in which the Federal Circuit employed a two-part test—focusing on causation and appropriation—to distinguish between a takings and a tort. These multifaceted approaches, heavily imbued, as they are, with factual considerations, strongly militate against the adoption of a bright-line rule that would require this court to dismiss plaintiffs’ complaint which avers that the invasion here was intended, the flooding foreseeable, and the damages severe—simply because it cites only a single recent flooding event.

There is no basis to adopt a bright line rule giving the Government the right to “one free flood” in every case—and certainly not on this record where the Plaintiffs’ properties lie within the reservoir that the flood-control dams were designed to create. This is particularly true in light of the severity associated with the Government’s operating concept of imposing flooding on homes and businesses with no legal right.

3. Each Plaintiff held a compensable property interest that was subjected to severe interference by the government’s action.

Each Test Property Plaintiff provided proof at trial of protectable interests in both real and personal property taken by the flooding from the Addicks and Barker reservoir pools; the lengthy record of that testimony and documentation will not be repeated here. Likewise the record confirms the severe nature of the deprivation of property rights caused by the Government’s actions. “It is the character of the invasion, not the amount of damage resulting from it, so long as the damage is substantial, that determines the question whether it is a taking.” *Big Oak Farms, Inc. v. United States*, 105

Fed. Cl. 48, 53 (2012) (quoting *United States v. Cress*, 243 U.S. 316, 328 (1917)). The question is “whether the injury constituted a sufficiently severe invasion that interfered with the landowner’s reasonable expectations as to the use of their property.” *Arkansas Game & Fish*, 736 F.3d at 1370. Among other deprivations, the Government’s actions denied each Plaintiff the right to use and enjoy the real and personal property interests they owned in the subject properties. *Ideker Farms, Inc. v. United States*, 136 Fed. Cl. 654, 679-80 (2018) (stating “for purposes of establishing severity, it is sufficient for plaintiffs to show that government-induced flooding has interfered with plaintiffs’ ability to use their land for its intended purposes”), *reconsideration denied*, 142 Fed. Cl. 222 (2019).

In addition, the expert testimony from Dr. Randall Bell and Mr. Matthew Deal, along with the factual testimony and documentary evidence from each Plaintiff, demonstrated how the Government’s storage of stormwaters on these properties severely interfered with their customary uses as well as the devastating effects of the intrusions on each Plaintiff. Each Plaintiff lost the customary use of their primary residence or business for an extended period of time, each lost access to and from their property, and each had economic losses in the form of property diminution and costs-to cure and repair. Aside from Popovici, each lost hundreds if not thousands of items of personal property which was destroyed. Neither the existence of protectable property interests, nor the severity of the Government’s interference with those interests, can be seriously questioned on this record.

Still, as in its motion to dismiss, the Government asserts that the Test Property Plaintiffs do not own property interests protected by the Just Compensation Clause by advancing the same arguments that Plaintiffs have no protectable property rights under Texas law, but trying to cloak the arguments in legal authority and terms different than before.²⁵⁵ However, the Government’s repeated

²⁵⁵ Compare U.S. Post-Trial Brief at 93-97, with United States’ Motion To Dismiss For Lack Of Jurisdiction And For Failure To State A Claim For Which Relief Can Be Granted, ECF No. 59, at 14-19.

attempts to classify the operative property rights as the “right to be free of flooding during a hurricane” fail to convince, and its supporting arguments fare no better.

As this Court recognized when rejecting the Government’s feint, the Texas Supreme Court has recognized that “where the government made a conscious decision to subject particular properties to inundation so that other properties would be spared, as happens when a government builds a flood-control dam knowing that certain properties will be flooded by the resulting reservoir[,] ... of course the government must compensate the owners who lose their land to the reservoir.” *In re Upstream Addicks and Barker (Texas) Flood-Control Reservoirs*, 138 Fed. Cl. at 667 (*quoting Harris Cty. Flood Control Dist. v. Kerr*, 499 S.W.3d 793, 807 (Tex. 2016)); *see also Tarrant Reg’l Water Dist. v. Gragg*, 151 S.W.3d 546, 555 (Tex. 2004) (finding a taking where “the extensive damage the [plaintiff] experienced was the inevitable result of the reservoir’s construction and of its operation as intended”); *Brazos River Auth. v. City of Graham*, 354 S.W.2d 99, 105 (Tex. 1961) (finding a taking and explaining that “decent regard for private property rights” requires compensation for flooding caused by “flood control and improvement agencies”). Plaintiffs held protectable property interests pursuant to the relevant state law principles. The Government’s attempt to invoke the police powers and necessity doctrines, and its assertion that Plaintiffs cannot recover because they purchased their properties after the dams had been built should again be rejected for the reasons previously found by this Court.

Nor is the Government insulated from liability by the federal Flood Control Act of 1928, 33 U.S.C. § 702(c). Once again, as this Court said in previously rejecting the same argument, “[t]he Flood Control Act does not supersede or bar this court’s jurisdiction over takings claims for flooding, and it does not extinguish plaintiffs’ substantive right to just compensation.” *In re Upstream Addicks and Barker (Texas) Flood-Control Reservoirs*, 138 Fed. Cl. at 668 (discussing *inter alia Scranton v. Wheeler*, 179 U.S. 141, 153 (1900) (“Congress may not override the provision that just compensation must be made when private property is taken for public use.”)). There is nothing in this record, or applicable statutory law,

that shows Congress has withdrawn its waiver of sovereign immunity for these claims, and § 702(c) remains completely irrelevant.

B. The Government’s Action in this Case was not an Exercise of Police Power that Absolves it of its Constitutional Obligation to Compensate Plaintiffs.

As in its motion to dismiss, the Government rests its “police power” defense on the doctrine as put forward in *Miller v. Schoene*, 276 U.S. 272 (1928)—a defense previously rejected by this Court. *See In re Upstream Addicks and Barker (Texas) Flood-Control Reservoirs*, 138 Fed. Cl. 658, 669 (2018) (“[I] was not that the government had to respond to Tropical Storm Harvey as an emergency that necessitated the flooding of private land, but rather it was the design of the dams and the government’s procedures for operating them, all put in place well before Harvey arrived.”). The police powers doctrine is no more applicable now than when this Court denied the Government’s motion to dismiss; indeed the only thing that has happened since this Court’s first rejection of the defense has been the mountain of evidence and testimony at trial which confirm that the police powers doctrine is wholly inapplicable to this action.

The Addicks and Barker dams were designed and constructed decades before Harvey and were intended to create the very reservoir pools that flooded Plaintiffs’ properties. The Corps’ mandatory procedures for operating the dams—meticulously followed with not a single discretionary deviation—were likewise in place years before Harvey. The purported “emergency” decisions which the Government relies on to trigger its police powers defense never existed.

C. The Doctrine of “Necessity” does not Absolve the Government of its Constitutional Obligation to Compensate Plaintiffs.

The Government’s purported “doctrine of necessity” defense likewise fails. Similar to the police power argument, the necessity doctrine is used to assess the Government’s response to situations that require immediate action. *Trinco Inv. Co. v. United States*, 722 F.3d 1375, 1380 (Fed. Cir. 2013) (“The

defense requires both an actual emergency and an *imminent danger met by a response* that is actually necessary) (emphasis added).”

Therefore, the “necessity doctrine” defense fails based on the same record evidence which shows that the Corps “decisions” concerning the design, construction, and operation of the Addicks and Barker dams were not made “in the heat of an emergency,” but were rather the result of the Corp following its standard operating protocols put in place years before Harvey. Accepting the Government’s invocation of the defense of “necessity” would stretch that doctrine well beyond its intended scope since the Government actions that form the basis of Plaintiffs’ claims took place years (even decades) before the Harvey event, and it was those Government actions which put the Corps in the situation about which it complains.²⁵⁶

Indeed, the cases that the Government points to as establishing the defense show it to be inapplicable. *Bowditch v. Boston*, 101 U.S. 16 (1879), involved a fire in the City of Boston. The holding discusses the authority of Fire Engineers to decide to destroy a house in order to prevent the fire from spreading based on laws of the municipality. *Id.* at 17. As *Bowditch* demonstrates, the doctrine only shields decisions made at the time of an immediate and impending threat. *See also TrinCo Inv. Co. v. United States*, 722 F.3d 1375, 1378 (Fed. Cir. 2013) (“The Supreme Court has consistently held that the doctrine of necessity may be applied only when there is an imminent danger and an actual emergency giving rise to actual necessity.”).

²⁵⁶ As noted, the claims in this case stem from the design, construction, and operation of the Addicks and Barker dams—actions that were taken, and operations that were mandated—years prior to August 2017. Furthermore, the government does not dispute that it could have averted any “crisis” by acquiring property interests in the relevant land decades ago, or at any time thereafter, when the Corps repeatedly decided not to acquire the right to flood all the land within the design pools of its dams. The government cites no case in which a purported emergency has ever excused a taking under similar circumstances—that is, where the government had predicted the “emergency” for many decades and could have averted it by condemning the affected property in the ordinary course. *Cf. TrinCo Inv. Co. v. United States*, 722 F.3d 1375, 1379 (Fed. Cir. 2013) (limiting the “necessity defense” to actions taken in the face of an “actual emergency with immediate and impending danger”).

Nor can the Government's long-contemplated and intended result, the flooding of the areas within the design reservoir of each dam, equate to the need to take "temporary, unplanned" measures taken "under exigent circumstances" as was faced by U.S. troops who occupied private buildings during the Panama riots in 1964, as the Government implies by citing *Nat'l Bd. of YMCA v. United States*, 395 U.S. 85, 92-93 (1969).

Nor does *United States v. Caltex (Philippines), Inc.*, 344 U.S. 149 (1952), help the Government. *Caltex* involved a claim based on the destruction of private oil terminal facilities during World War II to prevent the Japanese from taking control of those valuable wartime assets. The Court held that the unique circumstance requiring the destruction of property of strategic value during wartime to prevent the enemy from using it to wage war justified the demolition and shielded the United States from liability under the Fifth Amendment. 344 U.S. at 153.

And *Steele v. Houston*, 603 S.W.2d 786 (Tex. 1980) is completely inapposite since it was a case decided under Texas state takings principles and examined whether the state was required to compensate plaintiffs for property merely damaged though not taken (since title had not been transferred to the state), which is required by the Texas Constitution. *See* Tex. Const. art. 1, § 17. Even so, the Texas Supreme Court reversed summary judgment against the plaintiffs, holding they had stated a claim for compensation. 603 S.W.2d at 791 ("It is our opinion that plaintiffs' pleadings and their claim in contesting the motion for summary judgment established a lawful cause of action under Section 17, Article I, of the Texas Constitution.").

The Government's defense based on the doctrine of necessity should therefore be rejected for the same reasons as its police powers argument. This case requires looking at the Government's actions over the course of decades, not just in the moments before the destruction of Plaintiffs' property. Like the court in *TrinCo* this Court should reject the Government's attempt to stretch the necessity doctrine into a coverall for any claim against it.

D. Plaintiffs Have Proven the Taking of Personal Property.

The Government suggests that Plaintiffs' principal claims are for taking of real property.²⁵⁷ Not so. Within the limited scope of the liability phase of this case, Plaintiffs' amply proved the taking of personal property through extensive trial testimony.²⁵⁸ The Government complains that it "has no way of knowing what it allegedly took" because Plaintiffs did not each spend many hours on the stand to document each and every chair, table, family photo, child's toy and salt shaker that they had to throw to the curb.²⁵⁹ But at the liability phase of the trial, Plaintiffs have met their burden to substantiate that personal property is among their taking claims.²⁶⁰ The Government's complaint that their testimony was mere "generalities" is both wrong, and not a legal argument.²⁶¹

For its legal argument, the Government cites to a litany of cases to argue that all personal property claims are really claims for "consequential damages" and "not compensable under the Fifth Amendment."²⁶² However, not one of these cases are relevant to the claims, or facts presented here. In *Yuba Nat. Res., Inc. v. United States*, there was no compensation due for the difference in value of the gold over the time period of the temporary taking. 904 F.2d 1577, 1581–82 (Fed. Cir. 1990). In *Air*

²⁵⁷ U.S. Post-Trial Brief at 159.

²⁵⁸ *E.g.*, 6 RR 1717:24-1719:7; 1713:8-1716:25 (Banker); Banker 24e (pile of personal property); Burnham 54h (refrigerator); Burnham 54i (sofa covered with mold); 6 RR 1678:11–22 (Giron); 7 RR 1842:20-1844:14 (Holland); 5 RR 1391:4-15, 1392:4-15 (Strebel); 5 RR 1303:18-1304:20, 1326:7-23 (Micu); Micu Exhibit 10 at 38; 4 RR 1090:1-7, 1091:6-1092:6 (Soares); 6 RR 1603:21-1605:8 (Stewart); 6 RR 1635:8-1638:17 (Wind).

²⁵⁹ U.S. Post-Trial Brief at 160.

²⁶⁰ In addition to extensive trial testimony, Plaintiffs' Opening Post-Trial Brief discussed personal property as among the property interests. Plaintiffs' Opening Post-Trial Brief, ECF No. 235, at 26 (citing *Horne v. Dep't of Ag.*, 569 U.S. 513 (2013)).

²⁶¹ U.S. Post-Trial Brief at 159–60.

²⁶² U.S. Post-Trial Brief at 160–61.

Pegasus of D.C., Inc. v. United States, an FAA regulation prohibited operation of helicopters over Washington, D.C. 424 F.3d 1206, 1215 (Fed. Cir. 2005). The plaintiff, who was the leaseholder of the heliport, was denied compensation because it did not own the helicopters, and the frustration of its business expectations were derivative injuries only. *Id.* at 1215–16. Three other cases denied compensation for consequential damages because they were not the intended target of the Government action. *Mitchell v. United States*, 267 U.S. 341, 345 (1925) (damage to canning business after nearby farmland was taken by eminent domain); *R. J. Widen Co. v. United States*, 357 F.2d 988, 990, 993–94 (1966). (damage to tannery from loss of upstream water supply); *Klein v. United States*, 375 F.2d 825, 829 (1967) (damage to gravel contracts “simply frustrated”).

Here, Plaintiffs presented ample evidence at trial that the Government intended to capture and store stormwater in the Addicks and Barker Reservoirs, and intended to store the resulting pools on Plaintiffs’ private property, invading and damaging both their structures and their personal property.²⁶³ Not surprisingly, property-owners customarily keep their personal possessions in their homes. The Government’s attempt to evade liability for personal property must be rejected. The specific details related to a plaintiff’s personal property are best handled in the damages phase.

IV. PLAINTIFFS HAVE PROVEN A TAKING UNDER AN ARKANSAS GAME & FISH ANALYSIS.

Liability for this physical taking should be evaluated pursuant to the *Ridge Line* inquiry of whether the flooding they experienced was the “predictable result of the government’s action, and whether the government’s actions were sufficiently substantial to justify a takings remedy.” 346 F.3d at 1355. The desire by the Government to garner more leeway in avoiding compensating Plaintiffs by “replacing” this relatively objective standard in favor of the multi-factor analysis applied in *Arkansas*

²⁶³ See Plaintiffs’ Opening Post-Trial Brief, ECF No. 235, at 13–24; 28–39; 111–14.

Game is understandable, but unavailing. Yet even were this Court to analyze liability in this case based on the *Arkansas Game* analysis, a constitutional taking has been proven.

Initially, Plaintiffs would refer this Court back to the extensive discussion of the *Arkansas Game & Fish* factors in plaintiffs' Opening Post-Trial Brief. That discussion will not be repeated here.

A. The Time and Duration of the Taking.

Because Plaintiffs' properties were physically taken by the flooding from the reservoirs (whether temporarily or permanently), the "temporal element" of the analysis is used "to determine the measure of just compensation under the Fifth Amendment, not whether a claim arose at all. *Caquelin v. United States*, 140 Fed. Cl. 564, 573-74 (2018). Here, each Plaintiff lost the customary use and enjoyment of their real property for a significant period of time, and all but Popovici permanently lost a vast array and tremendous amount of personal property as well. The first factor supports a taking.

B. The Degree to Which the Invasion was Intended.

That the flooding of Plaintiffs' properties was intended is likewise clear. The flooding of these properties was "the direct, natural, or probable result of the authorized government action," as they lie within the design pool of the federal flood-control reservoir. *United States v. Dickinson*, 331 U.S. 745, 751 (1947) (taking of "an easement for intermittent flooding of land above the new permanent level" of a reservoir); *Stockton v. United States*, 214 Ct. Cl. 506, 519 (1977) (taking where reservoir behind government dam flooded private land contained therein); *Quebedeaux v. United States*, 112 Fed. Cl. 317, 323-24 (2013) (taking claim valid where government had "appropriated an interest for itself in the affected property" even though "only a single recent flooding event" was alleged).

Likewise, Plaintiffs' injuries—the lost use of flooded real property and the destruction/complete deprivation of personal property—were the "likely result" of the inundation of their homes and businesses. *Moden v. United States*, 404 F.3d 1335, 1343 (Fed. Cir. 2005). The Addicks and Barker dams

were designed, constructed, and operated with the intent and purpose of holding back stormwater runoff from the upper Buffalo Bayou watershed in amounts greater than those experienced during Harvey. Everything the Government did during Harvey was mandated by the approved Water Control Manual, and was done to effectuate the Project's public purpose of protecting downstream.²⁶⁴ The flood pools that resulted from the prescribed use and operation of the federal flood control Project was well within its design parameters, not only from the perspective of rainfall amounts, but also from the perspective of pool elevations.²⁶⁵ The evidence supporting the intent prong could not be stronger in this case, as is shown by evidence of the Government's repeated contemplations to buy the very land it knew its Project would necessarily occupy.²⁶⁶ The second factor supports a taking.

C. The Foreseeable Result of the Authorized Government Action.

The question presented by the third factor is whether the invasion of Plaintiffs' property was the foreseeable result of Government action. *Banks v. United States*, 138 Fed. Cl. 141, 150 (2018). As noted earlier, a taking is "foreseeable" if it is the direct, natural or probable result of the alleged Government authorized actions for a public purpose and not a mere eventual or consequential injury

²⁶⁴ See 1 R.R. 175:1-14 (Thomas: flooding of homes upstream during Harvey was no accident, was mandated by dictates of Water Control Manual); 1 R.R. 176:12-177:1 (Thomas: upstream homes flooded by runoff held back by federal project); 6 R.R. 1448:18-21 (Long: during Harvey the Government did not depart from the dictates of the Water Control Manual); 6 R.R. 1449:5-8 (Long: everything the Corps did during the Harvey event was covered by the Water Control Manual). As Richard Long testified, in his 41 years at the Corp, he is unaware of a single instance when the Water Control Manual had ever been disregarded. 6 R.R. 1446:16-24.

²⁶⁵ 1 R.R. 151:8-15;; 1 R.R. 152:2-3; 4 R.R. 995:10-24.

²⁶⁶ See 1 R.R. 289:21 (Corps considered acquiring additional upstream real estate in the 1980s but decided not to do so); JX 52, Buffalo Bayou and Tributaries, Texas, Reconnaissance Report: Section 216 Study, Addick and Barker Reservoirs, Houston, Texas (October 1995, USACE 015148) (1995 *Reconnaissance Report* wherein the Corps again considered acquiring real estate or a flowage easement but chose the "no action" alternative instead); 4 R.R. 852:19-853:6 (noting that the Corps has repeatedly evaluated, but never asked for, funds to acquire additional upstream land despite knowing that thousands of people live within the flood pools of the reservoirs).

inflicted by those actions. *Cary*, 552 F.3d at 1377; *Moden*, 404 F.3d at 1342; *see also Hansen v United States*, 65 Fed. Cl. 76, 97 (2005) (“the *Ridge Line* court adopted the traditional objective tort-causation approach to takings as an alternative means for establishing a takings claim,” which “allows a takings claim to lie so long as the harm is proximately related to the causative action”).

In this case the flooding of Plaintiffs’ homes and properties was actually foreseen. The Corps’ internal “Reservoir Structure” maps depict the elevations of upstream structures located within Addicks and Barker’s respective pools and are clear evidence of foreseeability.²⁶⁷ The building of flood-control dams with pool reservoirs large enough to include a specific area means that the natural and probable result of the design and construction of those dams is the flooding of the specific areas. The third factor supports finding a taking.

D. The Character of the Land at Issue.

The properties at issue are homes and businesses located within deed-restricted residential communities and adjacent commercial developments whose land use is grossly inconsistent with storing contaminated black water for weeks or months on end.²⁶⁸ As to this factor, the Corps not only forwent obtaining the legal right to impose flooding on these lands, it acted to aid the alteration of the “character of the land” from the rice fields it originally decided were cheap enough to flood and forwent obtaining the legal right to do so, to the more valuable properties that are now within the footprint of the reservoirs.²⁶⁹ As homes and places of business, the Plaintiffs’ properties are vulnerable

²⁶⁷ PX 268, Addicks and Barker Reservoir Structures Maps (USACE USACE668672-75); PX 271, Addicks and Barker Inundation Maps (2002 USACE 668684-85) (depicting area that would be covered by an Addicks reservoir pool of 108 feet and 112 feet and area covered by a Barker reservoir pool of 104 feet).

²⁶⁸ *See* 31 Fed. Reg. 9108 (July 2, 1966).

²⁶⁹ As the record shows, originally, the Corps followed a policy to decline all requests for channel improvements 2 R.R. 382:19-383:5. But in the late 1970s, the Corps reversed course and took affirmative actions to grant easements on its property within the reservoirs so that such development could

to loss from flooding, and the testimony from the each Plaintiff confirmed that their properties had never experience flooding of the kind or severity as the inundation that occurred during Harvey. The fourth factor supports a taking.

E. The Severity of the Interference.

“[I]t is the character of the invasion, not the amount of damage resulting from it, so long as the damage is substantial, that determines the question whether it is a taking.” *United States v. Cress*, 243 U.S. 316, 328 (1917). Plaintiffs meet the “severity” burden inasmuch as each of them testified to the permanent damage to and complete deprivation of the use and enjoyment of their real properties, and the permanent loss of their personal property. All Plaintiffs have suffered lost property value. Accordingly, this factor supports a taking.

F. Plaintiffs’ Reasonable Investment-Backed Expectations Regarding the Land’s Use.

Finally, the Government’s best effort comes in its attack under this *Arkansas Game* factor: the issue regarding the “reasonable investment-backed expectations” of the property owners of the use and enjoyment of their property. As noted previously, prior to *Arkansas Game*, this factor only applied in regulatory takings cases and examined whether a plaintiff’s “expectation that the regulatory regime in existence at the time of their acquisition will remain in place, and that new, more restrictive legislation or regulations [would] not be adopted.” *Love Terminal Partners, L.P. v. United States*, 889 F.3d 1331, 1345 (Fed. Cir. 2018). Given the physical taking involved here, the factor has no place in the analysis—and certainly should not be given the weight the Government would urge. *See Preseault v. United States*,

go forward. 2 R.R. 383:9-18. The Corps cannot now complain that it was caught unawares—or did not foresee—the change in the character of the land given the record showing it knew of, and aided, that change. 2 R.R. 387:1-4 (Thomas conceding the Government could have maintained its prior policy and simply said “no” to the developers); 2 R.R. 387:13-22 (Corps recognized its actions would result in more development and a greater risk of flood damages to private property in upstream areas).

100 F.3d 1525 (Fed. Cir. 1996) (“The Government’s attempt to read the concept of ‘reasonable expectations’ as used in regulatory takings law into the analysis of a physical occupation case would undermine, if not eviscerate, long-recognized understandings regarding protection of property rights; it is rejected categorically. The trial court erred in accepting the Government’s effort to inject into the analysis of this physical taking case the question of the owner’s ‘reasonable expectations.’”); *see also Palm Beach Isles Assoc. v. United States*, 231 F.3d 1354, 1364 (Fed. Cir. 2000) (noting that when a categorical taking is found to have occurred, “reasonable investment-backed expectations are not a proper part of the analysis, just as they are not in physical takings cases”).

Nevertheless, even if an analysis of this factor were proper in this case, the record shows it too supports the finding of a taking. Plaintiffs will not here cut-and-paste the lengthy analysis of the character and aspects of the various property interests held by Plaintiffs, or the reasonable expectations they had for the use and enjoyment of those properties which the Government’s flooding devastated. The Court is referred to that analysis at pages 56-100 of Plaintiff’s Opening Post-Trial Brief. That being said, the Government’s formulaic recitation that each and every Test Property “has historically been subject to natural flooding during large storms” is reflective of its willingness to overreach. As shown in Plaintiffs’ Opening Post-Trial Brief, the above-quoted statement has no basis in the record.

And as to knowledge, each Plaintiff testified that they did not know their property was sited within a federal flood-control reservoir pool.²⁷⁰ Plaintiffs’ lack of knowledge about their location within a federal reservoir correlates with the other evidence at trial (discussed above) regarding the

²⁷⁰ *E.g.*, 6 R.R. 1729:10-15 (Banker); 6 R.R. 1758:15-1760:3 (Burnham); 6 R.R. 1654:8-18, 6 R.R. 1651:8-17 (Giron); 7 R.R. 1834:14-16 (Holland); 5 R.R. 1413:15-1414:5 (Strebel, Lakes on Eldridge Community Association); 5 R.R. 1293:24-1294:15 (Micu); 5 R.R. 1225:2-17 (Popovici); 6 R.R. 1738:9-17 (Sidhu); 4 R.R. 1076:22-1078:3 (Soares); 6 R.R. 1607:19-22 (Stewart); 7 R.R. 2151:16-20 (Turney); 6 R.R. 1626:1-1627:7 (Wind); 7 R.R. 2120:20 - 2121:5 (Lesikar, West Houston Airport Corporation).

efforts of the Corps to downplay (or in some cases, conceal) this fact from the public. The evidence showed that citizens and landowners were kept in the dark about how the Addicks and Barker dams and reservoirs truly operated. The Government presented no evidence that the Test Property Plaintiffs knew, or reasonably should have known, their properties were subject to reservoir pool flooding.

In sum, the Plaintiffs' "reasonable investment-backed expectations" should not be at issue in a physical takings case, and even if the factor were to be considered, the issue represents at most "one factor" that is not "talismanic" or "dispositive." *Palazzolo v. Rhode Island*, 533 U.S. 634 (2001) (O'Connor, J., concurring); see *Ark. Game & Fish*, 568 U.S. at 39. And the reality remains that most of the Plaintiffs invested their life savings into the Test Properties without knowledge or expectation of a flood risk that the Government over the years acted to conceal and/or minimize. On this record, this factor supports a taking.

CONCLUSION

The thirteen Test Property Plaintiffs proved at trial that the U.S. Army Corps of Engineers designed, constructed, and operated the Buffalo Bayou & Tributaries Project with the intent to capture and store stormwater runoff from the upper Buffalo Bayou watersheds, and that during Tropical Storm Harvey, the Government impounded sufficient water to inundate Plaintiffs' private properties for the public benefit.

The Government's arguments that Harvey was an unprecedented rainfall event and the flooding of Plaintiffs' properties unforeseeable; that Harvey was an "emergency" that forced the Corps to make "zero-sum" decisions of whether to flood Upstream or Downstream properties; that Plaintiffs did not possess compensable interests in real and personal property under Fifth Amendment takings law; and that it gets "one free flood" of property within the design pool of its federal flood-control reservoir all should be rejected—as many have already been in this case.

The factual record of Government knowledge and intent concerning the design, construction, and operation of its Project, coupled with the expert evidence (including that from the Government's own hydrologist) confirming causation compel a finding that the United States is liable to each of the thirteen Test Property Plaintiffs for the physical taking of their real and personal property.

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned attorney hereby certified that a true and correct copy of the foregoing instrument was served on all counsel of record in this Sub-Master Cause by filing it via the Court's ECF system on September 6, 2019.

/s/ Daniel H. Charest

Daniel H. Charest