

A STUDY OF WATER USE BY CASINOS IN LAS VEGAS, NEVADA:
THE TRANSFORMATION OF A DESERT INTO AN OASIS

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Water is one of the scarcest resources in the Western United States. But when you drive down Las Vegas Boulevard in Las Vegas, Nevada you wouldn't believe that you are in one of the driest places in the Western United States.

Las Vegas is best known for the "Strip" – a 4.2-mile resort hotel and casino corridor. The most iconic feature of the Strip is the fountains outside the Bellagio Resort and Hotel. In front of the Bellagio there are more than one thousand fountains that shoot water over 100 feet in the air.¹ The fountains are contained in an 8.5-acre lake which holds more than 22 million gallons of water.² Yet, water activists often criticize the Bellagio for this man-made lake because it loses nearly 12 million gallons of water per year due to evaporation.³ With the average household swimming pool holding approximately 20,000 gallons of water⁴, the water lost per year is enough to fill six hundred pools.

Water is being used everywhere you turn on the Strip. From the 18,000 square foot dipping pool at the Venetian Resort and Hotel to the 1.6-million-gallon shark aquarium at the Mandalay Bay. Based on these water-extravagant

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¹ *Fountains of Bellagio*, BELLAGIO LAS VEGAS, <https://bellagio.mgmresorts.com/en/entertainment/fountains-of-bellagio.html> (last visited Nov. 8, 2020).

² *How Much Water Evaporates from the Bellagio Fountains*, LAS VEGAS SUN: ASK MR. SUN (Apr. 14, 2010, 2:00 AM), <https://lasvegassun.com/news/2010/apr/14/how-much-water-evaporates-bellagio-fountains/>.

³ *Id.*

⁴ Jackie McFadden & Jennifer Walker, *Facts about Texas Water*, SIERRA CLUB, https://www.sierraclub.org/sites/www.sierraclub.org/files/sce/lone-star-chapter/CHP-TX-1900-FactsAboutTexasWater__English_May%202016_weboptimized.pdf.

features, one would hardly believe that the city could run out of water as early as 2021.⁵

Yet the water these attractions use is de minimis compared to the water used by the nearly 42 million annual visitors that travel to the Strip. The average guest uses over 63 gallons of water per day and stays an average of 3.5 nights.

So how much water is used in Las Vegas' casino industry? Would it surprise you to find out that the amount of water used by resort hotels in Las Vegas equates to only seven percent of the total amount of water used in Las Vegas?

This paper explores the water resource challenges in Las Vegas and the impact of resort hotels. Part I of this paper looks at the history of Las Vegas' development and its access to water. Part II of this paper evaluates how the requirements of operating a resort hotel impact its water use. Finally, Part III discusses the water saving measures resort hotels have taken to reduce their water footprint.

Part I: History of Water and Gambling in Las Vegas, Nevada

Early History of Las Vegas

Las Vegas was first listed on an official government map in 1864 after mapmakers from the United States Army Topographical Corps surveyed what is presently the Las Vegas Valley.⁶ A journal entry from the mapmakers noted the significant amount of water in the area:

After a day's journey of 18 miles, in a northeasterly direction ... we encamped in the midst of another very large basin, at a camping ground called Las Vegas – a term which the Spanish use to signify fertile or marshy plants.⁷

At the time, the valley was home to several natural springs and lush grasses. Up until the 1900's the valley's population was minimal; as most of the political power and population were located in the northern part of the state working on the Comstock Lode. The Comstock Lode was a discovery of silver ore under the Virginia Range in Virginia City. The initial discovery of the Comstock Lode occurred in 1859 and is one of the most important discoveries in Nevada's mining history both in output and significance.⁸

⁵ Adam Tanner, *Las Vegas Water Source Could Run Dry by 2021*, REUTERS (Feb. 12, 2008, 1:11 PM), <https://www.reuters.com/article/environment-lasvegas-water-dc/las-vegas-water-source-could-run-dry-by-2021-idUSN1226683520080212>.

⁶ Alvin Jewett Johnson, *Johnson's California, with Territories of Utah, Nevada, Colorado, New Mexico and Arizona* (illustration), in WIKIPEDIA COMMONS (Mar. 18, 2011, 9:11 AM), https://commons.wikimedia.org/wiki/File:1864_Johnson_Map_of_California,_Nevada,_Utah,_Arizona,_New_Mexico_and_Colorado_-_Geographicus_-_Southwest2-johnson-1864.jpg.

⁷ EUGENE P. MOEHRING & MICHAEL S. GREEN, *LAS VEGAS: A CENTENNIAL HISTORY* 3 (2005).

⁸ Jerome Edwards, *Comstock Lode*, ONLINE NEV. ENCY. (May 3, 2011), <http://www.onlinenevada.org/articles/comstock-lode>.

With the large influx of miners and travelers to the state of Nevada for the Comstock Lode, gambling was very much a part of the culture as prospectors who traveled to the state brought their games of chance.⁹ Poker, Roulette, and Faro, which were some of the earliest types of organized gambling games, flourished at the mining camps and local saloons. Even before Nevada was granted statehood, local leaders were concerned about the effects of gambling in the state. To address these concerns, the territorial legislature passed an act in 1861 which created penalties for anyone who participated in or facilitated any games of chance. Illegal gambling was classified as a felony as part of the Act of 1861.¹⁰ The punishment was a jail term of up to two years and fine of \$5,000.00 for anyone who was caught gambling.¹¹

Gambling also existed on the Native American territories throughout the state. Evidence shows that Native Americans offered a game similar to Roulette in the Las Vegas Valley. The tribes catered to Mormon missionaries who were traveling from Salt Lake City, Utah.¹²

In 1864, Nevada was granted statehood. The inaugural session of the Nevada Legislature attempted to legalize gambling.¹³ The first legislature was unsuccessful, but as a compromise, the penalties for gambling were dramatically reduced.¹⁴ In 1869, the Nevada Legislature successfully made gambling legal again, reversing the Act of 1861. The measure was originally vetoed by the governor, but the state legislature overrode the governor's veto.¹⁵ As a result, the only regulations left were that professional gamblers could not operate a game without a license from a county sheriff and gambling could not be conducted in the front room of buildings.¹⁶ Nevada legislators saw gambling as a source of revenue for the state, as taxes collected from licensees was split between the state and local governments.¹⁷

Settlement of Las Vegas was stagnant until 1905, when the first auction of land in the Las Vegas Valley was conducted by the Las Vegas Land and Water Company (hereinafter "LVL&W").¹⁸ The company sold approximately 600 lots to investors from California.¹⁹ At the time, the valley's water came from a natural

⁹ See *History of Gaming in Nevada*, NEV. RESORT ASS'N, <https://www.nevadaresorts.org/about/history/> (last visited Oct. 12, 2020).

¹⁰ George G. Fenich, *A Chronology of (Legal) Gaming in the U.S.*, 3 GAMING RES. & REV. J. 65, 68 (1996).

¹¹ *Id.*

¹² *Id.*

¹³ NEV. RESORT ASS'N, *supra* note 9.

¹⁴ *Id.*

¹⁵ Ed Koch, *Bill that Transformed a City*, LAS VEGAS SUN (May 15, 2008, 3:00 AM), <https://lasvegassun.com/news/2008/may/15/bill-transformed-city/>.

¹⁶ NEV. LEGIS. COUNSEL BUREAU, GAMING IN NEVADA 2 (2016), <https://www.leg.state.nv.us/Division/Research/Publications/PandPReport/11-GN.pdf>.

¹⁷ *Id.*

¹⁸ MOEHRING & GREEN, *supra* note 7, at 13.

¹⁹ *Id.*

spring known as Big Springs and was owned by LVL&W.²⁰ Peter Boul, who would later become the first mayor of Las Vegas, realized that the key to making money in the Las Vegas real estate market was to have water to sell with the land.²¹ As a result, Peter Boul established the Vegas Artesian Water Syndicate, a company organized specifically to drill for groundwater.²² At the time the railroad had tied up most of the water rights to Big Spring.²³ Boul focused on tapping into smaller artesian springs that bubbled up to the surface in other parts of the valley.²⁴ Artesian wells are groundwater aquifers of trapped water surrounded by impermeable rock. The advantage of artesian wells is that the impermeable rock creates pressure causing the water to naturally rise to the surface. As a result, artesian wells do not require a pump.

The Birth of Las Vegas

In 1900, gold was discovered in Tonopah, Nevada.²⁵ LVL&W constructed a railway that ran from Tonopah through Las Vegas to connect to Southern California.²⁶ In the same year, Nevada again banned all forms of gambling because of mounting pressure from churches, educational leaders, women's groups, and other reformists.²⁷ One of the greatest opposers of legalized gambling was the Public Morals Committee of the Nevada Legislator.²⁸ Although gambling was illegal again, the Sheriff of Las Vegas refused to enforce the law, and many of the officers from the department continued to participate in backroom gambling.²⁹ At one point, charges were filed against one of the deputies for gambling after the reenactment of the ban.³⁰ Local district attorneys were tasked with enforcing the ban, but gambling continued to be a popular activity despite its illegality.

²⁰ See Classic Las Vegas, *Water, the Scotch 80s and the First Mayor of Las Vegas*, CLASSIC LAS VEGAS, <http://classiclasvegas.squarespace.com/classic-las-vegas-blog/2008/2/26/water-the-scotch-80s-and-the-first-mayor-of-las-vegas.html> (last visited Oct. 10, 2020).

²¹ A.D. Hopkins, *Peter Buol*, LAS VEGAS REV. J. (Feb. 7, 1999, 1:29 AM), <https://www.reviewjournal.com/news/peter-buol/>.

²² *Id.*

²³ *Id.*

²⁴ *Id.*

²⁵ See MOEHRING & GREEN, *supra* note 7, at 10.

²⁶ *Id.*

²⁷ Koch, *supra* note 15.

²⁸ Brett McGinness, *From the Archives: Here's How Nevada Banned Gambling and Reintroduced it on March 13, 1931*, RENO GAZETTE J. (Mar. 18, 2016, 1:54 PM), <https://www.rgj.com/story/life/2016/03/18/renoretro-nevada-relegalizes-gambling-march-19-1931/81983566/>.

²⁹ MOEHRING & GREEN, *supra* note 7, at 48.

³⁰ *Id.*

With the construction of the railroad, Las Vegas' population began to quickly grow. In 1911, the City of Las Vegas became incorporated.³¹ Las Vegas, Nevada continued to rely solely on the water from the artesian springs. The Las Vegas Valley was attractive to developers because of its potential for development. At the time, developers believed the valley had an abundance of water given its grassy and fertile landscape. In fact, in 1915, the Chamber of Commerce printed postcards portraying one of the Las Vegas Syndicate's artesian wells and described it as one of the largest artesian wells in the world.³²

By 1920, the population of Las Vegas was 2,304 people.³³ With the surge in population in Las Vegas and in the surrounding states of Wyoming, Colorado, Utah, New Mexico, and Arizona, these states became concerned about access to water. Because each of these states were located in the Colorado River Basin, each of them anxiously looked forward to securing their share of the Colorado River. In 1922, the Colorado River Compact (hereinafter "the Compact") was negotiated by the seven states of the Colorado River Basin.³⁴ Each state, including Nevada, was allocated a share. However, the water allocated to Nevada under the Compact provided little relief for Las Vegas at the time as there was no way of diverting water from the mighty Colorado River to Las Vegas. The Vegas Artesian Water Syndicate continued to be the sole provider of the water for the Las Vegas Valley, but residents became concerned about how long these artesian wells would last.

Additionally, with the arrival of the Roaring '20s, Nevada's legislators continued to wrestle with the issue of legalizing gambling, which was reflected in a number of the state's gambling laws. For example, the legislature considered a number of measures which would allow businesses to apply for a license to operate a limited number of slot machines. One bill was introduced in the Nevada Legislature in 1925 to legalize gambling, but the bill overwhelmingly failed.³⁵ That same year the bill was reconsidered by the Nevada Legislature, but fell short in the Nevada Senate by a single vote.³⁶ Although gambling was not legalized, other measures were approved and attitudes were becoming more relaxed including permitting certain "social games" which gave payouts in drinks and cigars.³⁷

Then, in 1931, two major events occurred which dramatically changed Las Vegas' future forever: construction of the Hoover Dam began, and gambling was legalized in Nevada.

When Water and Gambling Converge

³¹ *History Timeline*, LAS VEGAS SUN, <https://lasvegassun.com/history/timeline/> (last visited Oct. 10, 2020).

³² MOEHRING & GREEN, *supra* note 7, at 41.

³³ *History Timeline*, *supra* note 30.

³⁴ Upper Colorado River Basin Compact, Pub. L. No. 81-37, 63 Stat. 31 (1949).

³⁵ Koch, *supra* note 15.

³⁶ *Id.*

³⁷ NEV. RESORT ASS'N, *supra* note 9.

In 1928, the United States Congress passed the Bolder Canyon Project act which allowed for the construction of the Hoover Dam.³⁸ The act provided for “the construction of works for the protection and development of the Colorado River Basin, for the approval of the Colorado River compact.”³⁹ Under the previously negotiated Colorado Compact, Nevada was permitted to divert over 250 million gallons of water per day from the Colorado River.⁴⁰ Once the dam was constructed, Las Vegas would be able to access its share of the state’s water allocation. Lake Mead, was formed from the water dammed by Hoover Dam. However, Las Vegas Valley continued to rely on the groundwater supply controlled by LVL&W and the Vegas Artesian Water Syndicate. The rugged terrain between the Las Vegas Valley and Lake Mead made it impossible to utilize Nevada’s water allocation.

Not only did the act provide the potential for relief for Las Vegas’ strained water system, but the Act tremendously improved Las Vegas’ economy. The Act was passed at the beginning of the great depression. The Act appropriated \$165,000,000.00⁴¹ and attracted a total of 21,000 men.⁴² Construction on the Hoover Dam began in 1931. Shortly thereafter, a small work town named Boulder City was formed to house the workforce. The city was managed by the United States Bureau of Reclamation and as part of its local rules, banned alcohol and gambling.⁴³

During the same year construction began on the Hoover Dam, the Nevada Legislature passed the “Wide Open Gambling Bill,” which intended to “legalize liberally” gambling in the State of Nevada.⁴⁴ Phil Tobin, the sponsor of the bill, stated the purpose of the bill was not to make a Monte Carlo of Nevada, but to merely provide police regulation for an existing situation, and through taxation, to force a profitable business to bear its share of the state’s business.⁴⁵

With gambling outlawed in Boulder City, Las Vegas, located just 30 miles southeast of the construction of the Hoover Dam, became an attractive gambling destination for construction workers. In May of 1931, the first casino in Las Vegas opened named The Meadows.⁴⁶ Although Nevada legalized gambling, it

³⁸ H.R. 5773, 70th Cong. (1928).

³⁹ *Id.*

⁴⁰ *Id.* at 28.

⁴¹ *Id.* at 24.

⁴² *Hoover Dam: Frequently Asked Questions and Answers the Dam*, U.S. BUREAU RECLAMATION, <https://www.usbr.gov/lc/hooverdam/faqs/damfaqs.html> (last visited Sept. 29, 2019).

⁴³ Elizabeth Hix, *7 Things You Might Not Know About the Hoover Dam*, HISTORY (Sept. 1, 2018) <https://www.history.com/news/7-things-you-might-not-know-about-the-hoover-dam>.

⁴⁴ McGinness, *supra* note 28.

⁴⁵ *Id.*

⁴⁶ Koch, *supra* note 15.

was *and still is* illegal to operate a gambling establishment without a license.⁴⁷ The first four businesses in Las Vegas issued gambling licenses were located in Downtown Las Vegas.⁴⁸ Initial licensees took advantage of the legalization of gambling by opening bingo parlors, card rooms, and small casinos.

By 1940, the population in Clark County which incorporated both Las Vegas and Boulder City was 16,414 people.⁴⁹ By this point, gaming operations throughout Nevada were beginning to take hold and one of the most active areas was the Las Vegas Strip. The population in the valley on the weekends would exceed over 25,000 people as people tried their hand with Lady Luck.⁵⁰

Tommy Hull, a businessman who was granted a license to build a casino, saw the potential success of turning the local gambling industry into a tourism industry in Southern Nevada. He opened the El Rancho Hotel and Casino, the first full-scale resort in Las Vegas.⁵¹ Although other Casinos of similar notoriety had opened prior to the El Rancho Hotel and Casino, the El Rancho Hotel and Casino stood out because of its integrative nature. The casino was completely integrated. The El Rancho Hotel and Casino was the first gaming establishment to offer not only gaming but also lodging, dining, entertainment, and retail facilities.

Others quickly followed suit. The second major casino opened in Las Vegas was The Last Frontier, and it was built in 1942. In 1946, Bugsy Siegel, a notorious mobster, descended upon Las Vegas and opened the Flamingo Hotel and Casino. The Flamingo Hotel and Casino had a luxurious Monte Carlo theme, which would set the precedent for the montage of themes that Strip resorts boast today. These resorts located along Highway 91 would serve as the foundation for what is known today as the Las Vegas Strip. However, as these casinos became more integrated their demand for water also dramatically increased.

By 1952, commercial gambling surpassed mining and agriculture to become Nevada's largest revenue producing industry.⁵² Concerns about the influence of organized crime and corruption in the gaming industry led to the creation of the Nevada Gaming Control Board in 1955.⁵³ The Gaming Control Board was established under the Nevada Tax Commission and is tasked with overseeing the operation and licensing of Nevada casinos. The purpose of the Gaming Control Board regulations were to ensure casino's operated in a manner that protects the "public health, safety, morals, good order, and general welfare of the inhabitants

⁴⁷ NEV. REV. STAT. § 463.160 (2019).

⁴⁸ See *History of Gaming in Nevada "1930s"*, NEV. RESORT ASS'N, <https://www.nevadaresorts.org/about/history/> (last visited Oct. 6, 2019).

⁴⁹ LAS VEGAS SUN, *supra* note 30.

⁵⁰ EUGENE P. MOEHRING, RESORT CITY IN THE SUNBELT 212 (2000).

⁵¹ MOEHRING & GREEN, *supra* note 7, at 109.

⁵² See *History of Gaming in Nevada "1950s"*, NEV. RESORT ASS'N, <https://www.nevadaresorts.org/about/history/> (last visited Oct. 6, 2019).

⁵³ The Nevada Gaming Control Board was created to ensure gambling in the state of Nevada was conducted with integrity. See 1955 NEV. STAT. 32 (to be codified at NEV. REV. STAT. § 463.030 (2015)).

of the State of Nevada.”⁵⁴ Part of the Gaming Control Board’s authority includes the regulation of licenses.

Although Las Vegas’ economy was booming as the result of the legalization of gambling, concerns continued to exist about the availability of water. The earliest casinos recognized that the city’s lack of water resources could not support the industry’s long-term water needs. At this point the city was still relying on the few groundwater wells that had been previously constructed. Concerned that these wells would be insufficient, casinos began purchasing groundwater rights and dug their own well to service their properties.⁵⁵ One of the casinos to dig their own well was the Las Vegas Dunes Hotel and Casino.⁵⁶ Having access to a stable water source was important for the Dunes Hotel and Casino because they just built a brand new 450 room hotel tower that was surrounded by manicured green grass.⁵⁷

Concerned about the mismanagement of the dwindling groundwater supply and boom in population, the Nevada Legislature passed a bill enabling Las Vegas to create a water district.⁵⁸ In 1948, the Las Vegas Valley Water District was formed to handle the distribution and preservation of water in the Las Vegas Valley.⁵⁹ Shortly thereafter a pipeline from Lake Mead to Las Vegas was constructed. In 1955, Las Vegas received its first delivery of water from Lake Mead.⁶⁰

The Boom of Las Vegas

The 39-inch water line from Lake Mead to the Valley could supply 30 million gallons of water per day.⁶¹ Although the water provided by the pipeline helped relieve Las Vegas’s overstressed water system, the relief was only temporary. By 1962, water shortages again threatened the city’s ability to grow. Around the same time the Las Vegas Springs, which were relied on by the earlier settlers, stopped flowing to the surface due to the relentless withdraw of

⁵⁴ Nev. Gaming Comm’n Reg. 5.010 (2020).

⁵⁵ MOEHRING, *supra* note 50, at 215.

⁵⁶ John Fleck, *More on where the Bellagio fountain gets its water*, JFLECK AT INKSTAIN (March 5, 2013) <http://www.inkstain.net/fleck/2013/03/more-on-where-the-bellagio-fountain-gets-its-water/>.

⁵⁷ *Id.*

⁵⁸ The Bill permitted the establishment of a water district for the Las Vegas Valley. *See* 1947 NEV. STAT. 63 (to be codified at NEV. REV. STAT. § 332.015 (2017)).

⁵⁹ LAS VEGAS VALLEY WATER DISTRICT TIMELINE OF MILESTONES, <https://www.lvwd.com/about/history/index.html> (last visited Nov. 8, 2019).

⁶⁰ *Id.*

⁶¹ FLORENCE LEE JONES, WATER A HISTORY OF LAS VEGAS 36 (1975).

groundwater.⁶² The issue was the city's infrastructure was insufficient to keep up with the city's continually increasing average water demand. To increase the city's water infrastructure capacity, engineers began working on a project called the Southern Nevada Water System.⁶³ The project was a two-stage system designed to increase the amount of water that could be pumped from Lake Mead and delivered to Las Vegas.⁶⁴

During this time, Nevada was also seeing a boom in its gaming industry. By 1960, the total gross gaming revenue in the State exceeded \$200 million dollars annually.⁶⁵ Although the Gaming Control Board was already established and issuing licenses and help collects taxes from licensees, it became apparent further supervision was needed. To control licensure of gaming establishments, the Nevada Legislature passed the Gaming Control Act.⁶⁶ The Gaming Control Act established the Nevada Gaming Commission.⁶⁷ The act provided that the previously established Gaming Control Board work with the Nevada Gaming Commission instead of the Department of Taxation. The Nevada Gaming Commission's primary responsibility is to act on recommendations by the Nevada Gaming Control Board including serving as the final arbitrator on all gaming license matters.⁶⁸ The Commission also has the responsibility of adopting regulations to implement and enforce the State's laws governing gaming.⁶⁹ This act serves as the framework for Nevada's modern gaming regulations.

Las Vegas's economy continued to boom. It was estimated that 2.7 million visitors traveled to Las Vegas in 1967.⁷⁰ The number of residents also continued to surge as it was estimated that the Las Vegas Valley was gaining over 1,000 new residents per month.⁷¹ By 1970, the population in the Las Vegas Valley was over 125,000 people.⁷² In 1950, the entire state of Nevada had only 180,830 residents; by 1980, Clark County alone possessed 582,000 residents, not including the thousands of tourists visiting daily.⁷³ This growth in population

⁶² Kelsi Nelson, *How Did Las Vegas Get Its Name?*, http://ponce.sdsu.edu/nelson_081008.html (last visited Jan. 27, 2020).

⁶³ Las Vegas Valley Water District, *supra* note 59.

⁶⁴ *Id.*

⁶⁵ See *History of Gaming in Nevada "1960s"*, NEV. RESORT ASS'N, <https://www.nevadaresorts.org/about/history/> (last visited Oct. 6, 2019).

⁶⁶ See Nevada Gaming Control Act, NEV. REV. STAT. § 463 (2020).

⁶⁷ *Id.*

⁶⁸ *Nevada Gaming Commission*, NEV. GAMING CONTROL BD. & GAMING COMM'N, <https://gaming.nv.gov/index.aspx?page=3> (last visited Nov. 27, 2020).

⁶⁹ NEV. REV. STAT. § 463.1597 (2020).

⁷⁰ MOEHRING, *supra* note 50, at 107.

⁷¹ *Id.*

⁷² *Id.*

⁷³ Harrison Christian, *Water Use and Natural Limits in the Las Vegas Valley: A history of the Southern Nevada Water Authority* (Aug. 2009) (unpublished Master's thesis, University of Nevada Las Vegas) (on file with author).

also translated to a growth in daily water demand in the Valley. In 1981, the Valley's maximum daily water demand exceeded 200 million gallons per day.⁷⁴ However, relief was in sight as construction of the Southern Nevada Water Project was completed in 1982, which increased the capacity of valley's water system to 400 million gallons of water per day.⁷⁵

During this time construction of new casinos throughout the valley was rampant. To protect the health, safety, and general welfare of the residents of Las Vegas, Clark County implemented zoning ordinances for the construction of any new casinos. In 1989, Clark County established a zoning designation for casinos: Gaming Enterprise District.⁷⁶ The ordinance required that any non-restricted gaming licensee, which meant having fifteen or more slot machines, seeking constructional approval was required to build on parcels of land designated within the Gaming Enterprise District.⁷⁷ The goal was to prevent casinos from building in community neighborhoods.

In 1991, the Nevada Legislature passed a statute which required that non-restricted gaming licenses would only be issued in Clark County to operations meeting the requirements of a Resort Hotel.⁷⁸ To meet the resort hotel designation the casino had to have a minimum level of accommodations. Specifically the statute required that to qualify as a resort hotel the casino must have a minimum of 300 rooms for sleeping accommodations, a permanent bar, and a restaurant that was open 24 hours a day, seven days a week.⁷⁹ Although these requirements made sure operators weren't opening small "slot boxes," these additional requirements increased the use of water by casinos. By 1995, Nevada had one of the highest per water use rates in its history, using 315 gallons per person per day.⁸⁰

Las Vegas Today

Today, Nevada's gaming industry is omnipotent. Nevada's gaming industry is the largest in the United States and second largest in the world.⁸¹ Annual revenue from the industry is more than \$11 billion.⁸² Eighty percent of the state's

⁷⁴ LAS VEGAS VALLEY WATER DIST. TIMELINE OF MILESTONES, <https://www.lvvwd.com/about/history/index.html> (last visited Nov. 8, 2020).

⁷⁵ *Id.*

⁷⁶ LAS VEGAS, NEV., Ordinance 3472 § 1, 1989 (2001).

⁷⁷ *Id.*

⁷⁸ *See* NEV. REV. STAT. § 463.1605 (1991).

⁷⁹ *See* NEV. REV. STAT. § 463.01865 (1991).

⁸⁰ NEVADA DIVISION OF WATER PLANNING, NEVADA STATE WATER PLAN, SECTION 1, HISTORIC & CURRENT WATER USE 4 (1999).

⁸¹ David Schwartz, *My Nevada 5: The Days that Changed the Gaming World*, UNLV HISTORY (Apr. 9, 2014), <https://www.unlv.edu/news/article/my-nevada-5-days-changed-gaming-world>.

⁸² *Id.*

gaming revenue comes from Las Vegas alone.⁸³ In 2018, the gaming industry was responsible for generating over \$711 million dollars in tax revenue for the state.⁸⁴ Resort Hotels are also some of the largest property taxpayers in the state. Today, there are a total of 113 resort hotels in Las Vegas,; 38 of which are located on the Las Vegas Strip.⁸⁵

Today, the Las Vegas Valley Water District serves more than 1.5 million people.⁸⁶ The Las Vegas Valley Water District also supplies water for the 42.2 million people who visit Las Vegas each year as well.

The water demand from Southern Nevada is significant. Nineteen percent of Nevada's water use is for public purposes and seventy percent of the state's population lives in Southern Nevada.⁸⁷ Today, only ten percent of Las Vegas' water comes from groundwater aquifers.⁸⁸ The other ninety percent of the valley's water is supplied by Lake Mead.⁸⁹

The maximum storage level of Lake Mead is 1,225 feet above sea level. The last time the lake was at full storage capacity was 1983.⁹⁰ Today the lake is currently only at thirty-eight percent capacity.⁹¹ Since 1983 the average water level in the lake has decreased at an average rate of six feet per year; with Lake Mead reaching its lowest level in 2018 at 1,076 feet above sea level.⁹² In 2014 when water levels continued to reach unprecedented lows, concerns arose that the water level would dip below the existing water intake structure, which at that time was 1,050 feet above sea level.⁹³ As a result, in 2015, the Southern Nevada Water Authority completed construction of a new intake. The new outlet stands

⁸³ *Id.*

⁸⁴ *How Gaming Benefits Nevada*, NEV. RESORT ASS'N., <http://nevadaresorts.org/benefits/taxes.php> (last visited Oct. 6, 2019).

⁸⁵ Deborah Mahony, *How Many Hotels Are There in Las Vegas?*, ASK DEB: ANSWERS & ADVICE FROM REAL PEOPLE (July 6, 2018), <https://www.askdeb.com/travel/how-many-hotels-are-there-in-las-vegas/>.

⁸⁶ ABOUT THE LAS VEGAS VALLEY WATER DISTRICT, <https://www.lvwwd.com/about/water-district/index.html> (last visited Oct. 6, 2019).

⁸⁷ Tony S. Foresta, *How Does Nevada Use its Scarce Water Resources?*, GUINN CENTER (Sept. 5, 2018) <https://guinncenter.org/how-does-nevada-use-its-scarce-water-resources/>.

⁸⁸ *Where Your Water Comes From*, LAS VEGAS VALLEY WATER DIST., <https://www.lvwwd.com/water-system/where-your-water-comes-from/index.html> (last visited Oct. 6, 2019).

⁸⁹ *Id.*

⁹⁰ U.S. DEP'T OF INTERIOR, BUREAU OF RECLAMATION: LAKE MEAD ANN. HIGH & LOW ELEVATIONS (1935-2018), https://www.usbr.gov/lc/region/g4000/lakemead_line.pdf (last visited Oct. 6, 2019).

⁹¹ *Las Vegas Uncaps Lake Mead's "Third Straw" for Water Supply*, CBS NEWS (Sept. 24, 2015, 3:24 PM), <https://www.cbsnews.com/news/las-vegas-uncaps-lake-meads-third-straw-for-water-supply/>.

⁹² U.S. DEP'T OF INTERIOR BUREAU OF RECLAMATION, *supra* note 90.

⁹³ *Storage Capacity of Lake Mead*, NAT'L PARK SERV., <https://www.nps.gov/lake/learn/nature/storage-capacity-of-lake-mead.htm> (last visited Oct. 24, 2020).

at 860 feet above the surface.⁹⁴ The construction of a lower intake structure does not solve all of Nevada's water shortage problems because if the lake level dips below 1,075 feet above sea level, the Secretary of the Interior can declare a water shortage and reduce Nevada's allocation of water from the lake.⁹⁵ A reduction of Nevada's allocation of water from Lake Mead would further hurt Las Vegas' need for water.

Part II: Water Use by Resort Hotels

It is not the operation of a gambling hall itself that requires significant water resources. Instead, it is all of the integrated features required to qualify as a resort hotel. Nevada law requires that to open a casino in Las Vegas, the licensee must meet the requirements of a Resort Hotel.⁹⁶ A resort hotel is defined as:

Any building or group of buildings that is maintained as and held out to the public to be a hotel where sleeping accommodations are furnished to the transient public and that has:

1. In a county whose population:
 - (a) Is 700,000 or more, more than 200 rooms available for sleeping accommodations; or
 - (b) Is 100,000 or more and less than 700,000, more than 300 rooms available for sleeping accommodations;
2. At least one bar with permanent seating capacity for more than 30 patrons that serves alcoholic beverages sold by the drink for consumption on the premises;
3. At least one restaurant with permanent seating capacity for more than 60 patrons that is open to the public 24 hours each day and 7 days each week; and
4. A gaming area within the building or group of buildings.⁹⁷

Below, is an analysis of how each of these requirements increases a casino's water use and the difference between water use and water consumption.

Water Use by Resort Hotels

a. Hotel Accommodations

⁹⁴ Cody Miller, *Construction finishes on \$650 million Water Pumping Station at Lake Mead*, NEWS3LV (Apr. 7, 2020), <https://news3lv.com/news/local/construction-finishes-on-650-million-water-pumping-station-at-lake-mead>.

⁹⁵ *Drought and Climate Change*, S. NEV. WATER AUTH., <https://www.snwa.com/water-resources/drought-and-shortage/index.html> (last visited Oct. 23, 2019).

⁹⁶ NEV. REV. STAT. § 463.1605 (2005).

⁹⁷ NEV. REV. STAT. § 463.01865 (2013).

In Las Vegas there are over 150,000 hotel rooms.⁹⁸ The MGM Grand Las Vegas Hotel & Casino has the greatest number of rooms for one resort casino with 5,044 rooms.⁹⁹ Las Vegas Casinos use about three billion gallons of water per year; of which fifty-four percent of their water use is consumed inside the hotel rooms.¹⁰⁰

Water use can vary significantly based on the resort hotel's age, size, type of cooling system, on-site services provided (including laundry), landscaping, and amenities.

The table below breaks down the average demand of water by one guest at a resort hotel per day.¹⁰¹

Use	Water Demand (gal/guest-day)
Showers	16.2
Faucets	9.0
Toilets	10.9
Laundry	13.7
Icemakers	1.1
Cooling	12.3
Total	63.2

In total the average guest uses 63.2 gallons of water per day in their hotel room alone. The hotels on the strip boast an average occupancy rate of nearly ninety percent, which is significantly higher than the rest of the nation's hotel

⁹⁸ Steve Beauregard, *What is the Largest Hotel in Las Vegas? A Look at the Biggest Hotels on the Strip*, GAMBOOL, <https://gamboool.com/what-is-the-largest-hotel-in-las-vegas-a-look-at-the-biggest-hotels-on-the-strip> (last visited Oct. 10, 2020).

⁹⁹ *Id.*

¹⁰⁰ Suzanne Trabia, *Water Use on the Las Vegas Strip: Assessment and Suggestions for Conservation* (Apr. 2014) (online published B.A. Honors theses, University of Nevada-Las Vegas), https://digitalscholarship.unlv.edu/cgi/viewcontent.cgi?article=1016&context=honors_theses at 1.

¹⁰¹ See Heather Cooley et al., *Hidden Oasis: Water Conservation and Efficiency in Las Vegas*, PAC. INST.1, 51 (2007), https://pacinst.org/wp-content/uploads/2007/11/hidden_oasis3.pdf.

occupancy rate which sits at approximately sixty-six percent.¹⁰² Additionally, the average visitor stays three nights.¹⁰³ All of this put together means that the amount of water used by requiring casinos to provide sleeping accommodations greatly increases the amount of water the average casino uses.

b. Irrigation/Recreational Facility

Water is also needed for other purposes at resort hotels including landscaping and facility recreation centers. One of the most iconic features of the Las Vegas Strip is the Bellagio Fountains. The 8.5 acre lake holds twenty-two million gallons of water and loses nearly twelve million gallons of water per year.¹⁰⁴ Water for the fountains comes from a private well beneath the Bellagio Resort & Hotel Casino.

Just across the street you will find the 130-acre Wynn Golf Club which uses more than 100 million gallons of water per year.¹⁰⁵ Most of the water used for the golf course is to irrigate the grass. In Las Vegas an average square foot of grass requires seventy-three gallons of water per year.¹⁰⁶ This means that the Wynn's golf course requires approximately 413 billion gallons of water annually. With Las Vegas receiving only receiving about four inches of rain annually, outdoor landscaping can consume a significant amount of the city's water resources.¹⁰⁷

c. Restaurants

Restaurants can be one of the biggest water users in an operation of a resort hotel. The casinos on the strip have become known for their dining; particularly, their buffets. In 2014, 98,719 pounds of crab legs were served at the Aria Buffet.¹⁰⁸ It is estimated that 60,000 pounds of shrimp are eaten at the buffets in Las Vegas, per day.¹⁰⁹ The food is also washed down with thousands of alcoholic

¹⁰² *Frequently Asked Las Vegas Research Questions*, LAS VEGAS CONVENTION & VISITORS AUTH., <https://www.lvcva.com/stats-and-facts/visitor-statistics/faq/> (last visited Oct. 10, 2020).

¹⁰³ *Id.*

¹⁰⁴ LAS VEGAS SUN, *supra* note 2.

¹⁰⁵ Chris Kudialis, *The Strip Might Use Less Water Than You Think*, LAS VEGAS SUN (May 10, 2018), <https://lasvegassun.com/news/2018/may/10/the-strip-might-use-less-water-than-you-think/>.

¹⁰⁶ Kent Sovocool, *Xeriscape Conversion Study Final Report*, S. NEV. WATER AUTH. (2005), <https://www.snwa.com/assets/pdf/reports-xeriscape.pdf>.

¹⁰⁷ Foresta, *supra* note 87.

¹⁰⁸ Kristine McKenzie, *Fun Vegas Food Facts*, BLOG.VEGAS.COM (Oct. 20, 2015), <https://blog.vegas.com/las-vegas-dining/fun-vegas-food-facts-61617/>.

¹⁰⁹ Kevin Revolinski, *9 Las Vegas Fun Facts*, READER'S DIG., <https://www.readersdigest.ca/travel/world/9-las-vegas-fun-facts/> (last updated Mar. 20, 2019).

drinks. It was reported that over 43,363 margaritas were ordered at Hecho en Vegas at the MGM Grand Las Vegas Hotel & Casino in 2014.¹¹⁰

The hundreds of restaurants located on the Las Vegas Strip produce and serve a significant amount of food. At a minimum, Nevada law requires that a resort hotel have at least one restaurant open 24 hours a day and seven days a week, with a seating capacity of at least sixty people.¹¹¹

Water is used for virtually everything in a restaurant, including cooking, dishwashing, and, cleaning. Water use in the restaurant industry is significant. Water use in food establishments accounts for approximately fifteen percent of the total water use in commercial and institutional facilities in the United States.¹¹² Studies suggest that the average sit-down restaurant uses 3,000 to 7,000 gallons of water per day, or approximately twenty-four gallons per seat per day.¹¹³ This means that at a minimum the 60-person capacity restaurant at each resort hotel is using approximately 1,440 gallons of water per day. Given the hundreds of restaurants located on the Las Vegas Strip, it is impossible to quantify the exact amount of water that is used.

d. Other Consumers

There are numerous other aspects of the operation of a resort hotel that contribute to its water use. For example, opulent and luxurious shops line the Strip. Retailers along the Strip include Chanel, Prada, Yves Saint Laurent, and Gucci. Located in Planet Hollywood Resort is the Miracle Mile Shops, which is a 1.2 mile stretch of retail stores.¹¹⁴ Retail stores contribute to water consumption. Although water use varies considerably among retail stores based on their operations, retail stores use water both for facilities purposes as well as in operation, including use for restrooms and cooling. There are many aspects of resort hotels that quantifying the amount of water used would be difficult to define with exact precision.

e. Conclusion

Although it is difficult to provide an exact number, in total it is estimated that the average daily water demand per tourist on the Las Vegas Strip is 219

¹¹⁰ McKenzie, *supra* note 108.

¹¹¹ NEV. REV. STAT. § 463.01865 (1991).

¹¹² *Saving Water in Restaurants*, NAT'L SERV. CTR. FOR ENV'T PUBL'NS: ENV'T PPROT. AGENCY 1 (Nov. 2012).

¹¹³ Martin Flusberg, *Water, Water Everywhere... and 10 Ways for Restaurants to Stem the Flow*, POWERHOUSE DYNAMICS, <https://powerhousedynamics.com/resources/white-papers/water-water-everywhere-and-10-ways-restaurants-stem-flow/> (last visited Oct. 10, 2020).

¹¹⁴ *Miracle Mile Shops, Restaurants and Entertainment*, CAESARS, <https://www.caesars.com/planet-hollywood/things-to-do/miracle-mile-shops#.XcDemS2ZPBJ> (last visited Oct. 10, 2020).

gallons per day.¹¹⁵ In comparison, the average household in Las Vegas uses 222 gallons of water per day.¹¹⁶ As a result, operating a resort hotel requires the use of a significant amount of Nevada's limited water.

Water Use versus Water Consumption

Water use and water consumption are two distinct concepts. *Water use* describes the total amount of water withdrawn from a source over a given period of time. Water use measures the amount of water taken from a source irrespective of the amount that is returned after it is used and treated. *Water consumption* is the portion of water used which is not returned to the original water source after being withdrawn. For example, although the average daily water use per tourist on the Las Vegas strip is 219 gallons per day¹¹⁷, the amount of water actually consumed is approximately 2 gallons, or one percent of what is actually used.¹¹⁸

It is important to measure both water use and water consumption. Measuring water use is important for understanding the rate of withdrawal and dependency on a water source. With water use, it is also important to evaluate what the water is used for and its condition when it is returned to its watershed. Measuring water consumption is important for understanding sustainability of a source.

Each state's allocation of water under the Colorado River Compact is based on consumptive use.¹¹⁹ Consumptive use is the amount of water diverted minus any water that is returned to the Colorado River. For Nevada, water that is used but then recycled back to Lake Mead to be reused does not count towards the state's total consumptive use.

Approximately sixty percent of water withdrawn from Lake Mead by Southern Nevada Water Authority's users is consumed.¹²⁰ The other forty percent of water is reused in one of two ways: direct reuse and indirect reuse.¹²¹

Direct reuse is water that is treated at a wastewater treatment plant and then used for non-potable uses including golf courses and park irrigation. Direct reuse accounted for only three percent of Southern Nevada's Water use in 2017.¹²²

Indirect reuse is water which is treated and then discharged into its original water source.¹²³ As a result, for every gallon of water which is treated and returned to Lake Mead, Southern Nevada can withdraw and use an additional

¹¹⁵ Daniel Person, *Water Conservation, Brought to You by Las Vegas*, OUTSIDE (Sept. 22, 2015), <https://www.outsideonline.com/2016686/water-conservation-brought-you-las-vegas>.

¹¹⁶ Thomas Renner, *Las Vegas Goes All In*, WATER & WASTE DIG., (Feb. 24, 2020), <https://www.wwdmag.com/editorialtopical/las-vegas-goes-all>.

¹¹⁷ *Id.*

¹¹⁸ Kudialis, *supra* note 105.

¹¹⁹ Colorado River Compact, *supra* note 34, at 32.

¹²⁰ S. NEV. WATER AUTH., *2019 Water Resource Plan*, at 25 (2019).

¹²¹ *Id.*

¹²² S. NEV. WATER AUTH., *2018 Water Budget*, at 56 (2018).

¹²³ S. NEV. WATER AUTH., *2019 Water Resource Plan*, at 25 (2019).

gallon beyond Nevada's base allocation.¹²⁴ Ninety-seven percent of the water reused in Southern Nevada is indirectly recycled and returned to Lake Mead.¹²⁵ The returned water results in a flow credit and allows the Southern Nevada Water Authority to withdraw an additional amount equal to that returned. Return flow credits expands Southern Nevada Water Authority's Colorado River allocation by approximately seventy-five percent.¹²⁶

With respect to casinos, much of the water used by resort hotels is sent to treatment plants and is returned to Lake Mead. MGM Resorts and Hotels reported that ninety-nine percent of the water used by its resort hotels in Las Vegas is converted to indirect reuse and returned to Lake Mead.¹²⁷ The ability for resort hotels to reduce their water use and water consumption helps alleviate the stress on Las Vegas' water resources.

Part III: Water Saving Measures by Resort Hotels

Resort hotels have taken steps to reduce their water use. For example, MGM Resorts and Hotels currently use twenty-five percent less water per square foot today than it did in 2007.¹²⁸ Caesar's Entertainment group has reduced its water use and consumption at its properties by twenty percent since 2008.¹²⁹ These resort hotels are continuing to look at ways to lower their water footprint. The Las Vegas Sands Company has set a goal to reduce water consumption at all Sands properties worldwide by three percent on a square foot basis.¹³⁰ Below I discuss some of the steps resort hotels have taken to conserve water including operational changes, educating employees, and setting overall water-use goals.

a. Bathroom Fixtures

As discussed above, restrooms account for nearly thirty percent of a resort hotel's water use.¹³¹ To reduce water use many resort hotels have installed low-

¹²⁴ *Our Current Water Supply*, S. NEV. WATER AUTH., <https://www.snwa.com/water-resources/current-water-supply/index.html> (last visited Nov. 27, 2020).

¹²⁵ *Id.*

¹²⁶ Sylvia Harrison, *Managing Municipal Wastewater in Nevada: A History to Build On*, NEV. L., July 2016, at 27.

¹²⁷ MGM RESORTS INT'L, 2017 CORPORATE SOCIAL RESPONSIBILITY REPORT 36 (2017), <https://www.mgmresorts.com/content/dam/MGM/corporate/csr/annual-report/mgm-resorts-corporate-social-responsibility-annual-report-2017.pdf>.

¹²⁸ *Id.* at 34.

¹²⁹ Miranda Wilson, *Sustainability on the Strip: Behind the Glitz and Glamorous Excess, Properties are Serious About Being Green*, LAS VEGAS SUN (Apr. 21, 2019), <https://lasvegassun.com/news/2019/apr/21/sustainability-on-the-strip-behind-the-glitz-and-g/>.

¹³⁰ *Id.*

¹³¹ Brian Clark Howard, *Hotels Save Energy with a Push to Save Water*, NAT. GEOGRAPHIC (Feb. 24, 2014), <https://www.nationalgeographic.com/news/energy/2014/02/140224-hotels-save-energy-with-push-to-save-water/>.

flow shower heads and faucets. Conventional showerhead fixtures use approximately 2.5 gallons of water per minute, compared to low flow showerheads which use only 1.8 gallons per minute.¹³² With an average shower time length being approximately eight minutes the installation of these shower heads can save five gallons of water per shower.¹³³

Another way resort hotels can reduce their water use is by updating other bathroom fixtures. Conventional faucets use between two and four gallons of water per minute. A high efficiency low flow sink uses only one gallon per minute.¹³⁴

On February 5, 2014, Caesar's Entertainment signed onto to the Environmental Protection Agency's WaterSense H2Otel Challenge which is a program designed "to encourage hotels to use best management practices that will save water and money."¹³⁵ As part of the program, Caesar's Entertainment has replaced over 10,700 conventional shower heads with low flow shower heads at their properties located on the Strip.¹³⁶ As a result, Caesar's Entertainment has saved an estimated 50.5 million gallons of water per year.¹³⁷ This has resulted in an estimated savings on water costs of nearly \$100,000.00 a year.¹³⁸

In public bathrooms in resort hotels, many resort hotels are replacing conventional urinals with no flush urinals.¹³⁹ These new urinals use approximately half a gallon less than conventional urinals.¹⁴⁰ Each urinal saves as much as 35,000 gallons of water per year.¹⁴¹ Additionally, the Mandalay Bay Resort and Hotel has installed motion-sensitive, water-saving toilets in all of their public bathrooms.¹⁴² All of these measures help minimize resort hotels' water use.

b. Laundry Facilities

¹³² *Id.*

¹³³ *Save Water and Energy by Showering Better*, EPA WATER SENSE, https://www.epa.gov/sites/production/files/2017-02/documents/ws-ourwater-shower-better-learning-resource_0.pdf (last visited Oct. 8, 2020). *See id.*

¹³⁴ Howard, *supra* note 131.

¹³⁵ *Id.*

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *See generally id.*

¹³⁹ *Hotels Find Ways to Reduce Water Usage*, WATERLESS (Feb. 20, 2019), <https://www.waterless.com/blog/hotels-find-ways-to-reduce-water-usage>.

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² MANDALAY BAY CONVENTION RESORT LAS VEGAS, MANDALAY BAY CONVENTION RESORT GREEN IN WAYS THAT MIGHT SURPRISE YOU, <https://mandalaybay.mgmresorts.com/content/dam/MGM/mandalaybay/meetings/documents/mandalay-bay-meetings-green-e-brochure.pdf> (last visited Oct. 16, 2020).

Resort hotels have also taken steps to reduce water use in laundry facilities. Although many of the resort hotels contract with outside facilities for laundry services, such providers clean over 200,000 towels per day for the resort hotel industry.¹⁴³ Laundry operations consist of nearly sixteen percent of a resort hotel's water use.¹⁴⁴ To reduce water use, Caesar's Entertainment is transitioning from conventional washing machines to tunnel washers which creates a tunnel of water and detergent, requiring less water.¹⁴⁵

Caesar's Entertainment also instituted a policy at their resort hotels in Las Vegas in which linens are only washed every third day of a guest's stay, unless someone makes a special request.¹⁴⁶ As a result of these changes, the resort hotels owned by Caesar's Entertainment have reduced their water use in their laundry facilities by thirty million gallons a year, while expanding capacity by forty percent.¹⁴⁷

The Mandalay Bay Resort and Hotel adopted a similar program called the "Linen Reuse" program, which encourages the reuse of linens and towels by guests.¹⁴⁸ The program has reduced the resort hotel's water usage by more than 100 million gallons of water per year.¹⁴⁹ Resort hotels are working with guests to eliminate excess water use and ultimately lower the strain on Las Vegas' water system.

c. Landscaping

One of the biggest ways by which a resort hotel can minimize their water use and water consumption is by changing their irrigation and landscaping practices. Landscaping accounts for the most water consumption by a resort hotel because it doesn't get reclaimed, recycled, or put back into Lake Mead. One square foot of traditional landscaped area requires approximately 79 gallons of water per year.¹⁵⁰ It was approximated that nearly 400 million gallons of water were consumed at the fourteen largest resort hotels in Las Vegas to water traditional landscape features.¹⁵¹

¹⁴³ Ed Komenda, *Unsolved Mystery: Who is Sabotaging the Strip's Sheets and Towels with Dye Bombs?*, LAS VEGAS SUN: VEGAS INC. (Nov. 1, 2013, 2:00 AM), <https://vegasinc.lasvegassun.com/business/2013/nov/01/mystery-unsolved-who-sabotaging-strips-sheets-and-/>.

¹⁴⁴ Howard, *supra* note 131.

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ MANDALAY BAY CONVENTION RESORT LAS VEGAS, *supra* note 142.

¹⁴⁹ *Id.*

¹⁵⁰ Nevada Business Magazine, *Water-Smart Landscaping Makes Cents: Dealing with Nevada's Drought*, NEV. BUS. MAG. (Jun. 1, 2005), <https://www.nevada-business.com/2005/06/water-smart-landscaping-makes-cents-dealing-with-nevadas-drought/>.

¹⁵¹ Suzanne Trabia, *supra* note 100, at 23.

To reduce water use and consumption, resort hotels are implementing water smart landscaping. With water smart landscaping, water consumption can be reduced by nearly a quarter. If all of the traditional landscaping at the fourteen largest resort hotels were replaced with water smart landscaping, over 100 million gallons of water per year could be saved.

One of the most popular types of water smart landscape is called xeriscape. The Southern Nevada Water Authority created a new program called the “Water Smart Program” encouraging individuals to convert from traditional landscape to a water smart desert-style landscape.¹⁵² A xeriscaped area uses only fifty-four gallons of water a year per square foot.¹⁵³

As part of the “Water Smart Program”, the Southern Nevada Water Authority provides a list of plants adaptive for the dry desert climate and gives best management practices for maintaining water smart landscaping.¹⁵⁴ Installing water smart landscaping is advantageous over completely removing all plants because landscaping provides secondary benefits including shade, erosion protection, and aesthetic value.

Resort hotels are implementing water smart landscaping to reduce the amount of water they use for landscaping and irrigation. These resorts have ditched the large grassy lawns that once were a focal point for attracting visitors and instead have planted desert-appropriate native plants.

For example, the Bellagio Hotel and Casino, which is known for its world-famous water show, recently removed more than 20,000 square feet of thirsty lawns and flowering plants and converted it to rock mulch.¹⁵⁵ MGM Resorts have removed over 200,000 square feet of grass at their Las Vegas properties and have replaced it with drought tolerant landscaping.¹⁵⁶

The Palazzo, which is owned by the Las Vegas Sands corporation, took steps to improve its water efficiency in managing its landscaping. The Palazzo draws water from a well below the resort hotel.¹⁵⁷ Due to poor groundwater quality because of its overuse, the water cannot be used unless it is treated. As a result, the Palazzo has built a small water treatment facility on the bottom level of their parking garage.¹⁵⁸ The system uses an environmentally friendly nano water filtration system. The water withdrawn from the well is used to operate the resort hotel’s entire horticulture system. Additionally, the water is used at the Venetian

¹⁵² WATER SMART LANDSCAPES REBATE, <https://www.snwa.com/rebates/wsl/index.html> (last visited Nov. 8, 2020).

¹⁵³ Trabia, *supra* note 100, at 21.

¹⁵⁴ PLANT SEARCH BY CHARACTERISTICS, <https://www.snwa.com/landscapes/plants/characteristics.cfm> (last visited Oct. 16, 2020).

¹⁵⁵ WATERLESS, *supra* note 139.

¹⁵⁶ MGM RESORTS INT’L, *supra* note 127, at 36.

¹⁵⁷ Wilson, *supra* note 129.

¹⁵⁸ Sam Argier, *How Las Vegas Resort-Casinos Are Leading the Way in Water Conservation*, FOX 5 (Nov. 18, 2019), https://www.fox5vegas.com/news/how-las-vegas-resort-casinos-are-leading-the-way-in/article_a3771206-0a40-11ea-8390-4b6b06ac7758.html.

Resort and Hotel for other outdoor purposes. Over twenty-two million gallons of water are withdrawn from the groundwater well.¹⁵⁹

The Palazzo and Venetian resorts are not the only resort hotels on the strip that rely on underground well water. The Wynn Las Vegas Resort Hotel and Casino uses groundwater to water its 18-hole golf course.¹⁶⁰ The water supplied for the Bellagio Hotel and Casino comes from a groundwater well. Using non-potable groundwater for outdoor purposes is more efficient than using water from Lake Mead because the water used for landscaping is consumed and not returned to the system. Using groundwater for consumptive purposes reduces the amount of pressure placed on Las Vegas' water system.

Although resort hotels can take further steps to reduce their water use, the measures they are already taking are helping casinos reduce their water footprint and continue to reduce the amount of water they use and consume.

d. New Construction

Since 1990 any new resort hotel built in Las Vegas is required to submit a water conservation plan as part of the approval process for construction.¹⁶¹ Part of the water conservation plan must include plans that show that the new construction is implementing water efficient technologies, minimizing landscaping, and implementing water smart designs.¹⁶²

Resort hotels are also taking steps beyond the city's requirements. In addition to water smart programs resort hotels have signed onto with the Environmental Protection Agency and the Southern Nevada Water Authority, resort hotels are looking to have their facilities qualify for LEED certification. The LEED certification program is ran by the United States Green Building Council. LEED stands for leadership in energy and environmental design. The LEED certification program, is a group of independent organizations, which has developed practices for environmentally friendly design, construction, and operation.¹⁶³ A new construction that implements a certain number of these practices can qualify for LEED certification. There are different levels of LEED certification and qualification is based on the number of environmentally practices implemented.

¹⁵⁹ *Id.*

¹⁶⁰ *Entertainment and Attractions, Wynn Golf Club Course Design*, WYNN LAS VEGAS, <https://www.wynnlasvegas.com/hotel-information/entertainment> (last visited Oct. 16, 2020).

¹⁶¹ ACCU Weather, *Las Vegas Casinos Conserve Water Amid Drought*, ACCUWEATHER (May 3, 2014, 6:40 PM), <https://www.accuweather.com/en/weather-news/las-vegas-casinos-conserve-water-amid-drought-3/407603>.

¹⁶² *Id.*

¹⁶³ Rachel Burger, *What are the Benefits of LEED Certification*, BALANCE SMALL BUS. (Aug. 9, 2019), <https://www.thebalancesmb.com/what-are-the-benefits-of-leed-certification-845365>.

LEED lists four water efficiency categories a building may seek credit for: outdoor use, indoor use, specialized use, and metering.¹⁶⁴ A building can receive credit if they implement a water reuse system.¹⁶⁵ To reduce outdoor water consumption, the program encourages efficient irrigation and proper plant species selection.¹⁶⁶ To receive credit for indoor use, the facility must install a minimum number of water smart fixtures and appliances within the building.¹⁶⁷ Further, a building can be credited with water efficient cooling towers if the water in the cooling towers are below a maximum particulate limit.¹⁶⁸

Resort hotels on the Las Vegas Strip are incorporating these LEED standards into their new construction. One example is the Aria Resort & Casino. The Aria Resort & Casino was built in 2009 and includes a 4,000-room resort, 700,000 square foot conference center, two condo-hotels, two residential towers, and, a retail district.¹⁶⁹ The resort hotel was one of the first resort hotels in Las Vegas to achieve a LEED designation and received six LEED Gold Awards.¹⁷⁰ The resort hotel uses forty percent less water within the building and sixty percent less water outside the building as compared to if it was built based on minimum building codes.¹⁷¹ This results in an estimated 31 million gallons of water saved per year.¹⁷² The water saved is equivalent to the annual water consumption of more than 380 households.¹⁷³

The Monte Carlo Resort and Hotel, which was renovated and reopened in 2018 as the Park MGM Las Vegas is the newest casino to receive a LEED gold

¹⁶⁴ See generally, *Leed Credit Library*, U.S. GREEN BLDG. COUNS., <https://www.usgbc.org/credits?Version=%22v4.1%22&Rating+System=%22New+Construction%22&Category=%22Water+efficiency%22> (last visited Oct. 28, 2020).

¹⁶⁵ See generally, *Outdoor Water Use Reduction*, U.S. GREEN BLDG. COUNS., <https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-healthc-164?return=/credits/New%20Construction/v4.1> (last visited Oct. 28, 2020).

¹⁶⁶ *Id.*

¹⁶⁷ See generally, *Indoor Water Use Reduction*, U.S. GREEN BLDG. COUNS., <https://www.usgbc.org/credits/new-construction-core-and-shell-data-centers-new-construction-warehouse-and-distribution0?return=/credits/New%20Construction/v4.1> (last visited Oct. 28, 2020).

¹⁶⁸ *Id.*

¹⁶⁹ MGM Resorts, *Green Building*, MGM RESORTS INT'L., <https://www.mgmresorts.com/en/company/csr/environmental-sustainability/green-building.html> (last visited Oct. 28, 2020).

¹⁷⁰ *Id.*

¹⁷¹ Press Release, Aria Resort & Casino Las Vegas, City Center Fast Facts (on file with the author).

¹⁷² *Id.*

¹⁷³ City Center Las Vegas, *Environmental Commitment*, CITY CENTER LAS VEGAS (2012), http://www2.citycenter.com/luxury_las_vegas_condos/files/ARIASustainabilityRackBrochure.pdf.

certification for its efforts in its outdoor dining and entertainment district.¹⁷⁴ The area boasts a seventy-two percent reduction in water use over traditional designs.¹⁷⁵ The T-Mobile Arena, which is part of the newly redesigned entertainment district, is the first sports and entertainment stadium in Las Vegas to achieve a LEED green building certification.¹⁷⁶ The T-Mobile Arena, which is home to the Las Vegas Golden Knights, is a multi-purpose arena which can be configured to have up to 20,000 seats for any event with 650,000 feet of sport and entertainment space.¹⁷⁷ The building was designed to include many water saving features. Inside, the arena has many water saving fixtures including waterless urinals and low flow toilets reduce indoor water use by forty percent.¹⁷⁸ The use of drought tolerant plants and drip irrigation systems outside the arena reduces water use by seventy percent.¹⁷⁹ The building uses an onsite well to provide all of the irrigation water for the facility and as a result does not use any water from the city's water supply for outdoor use.¹⁸⁰

Resort hotels are not only retrofitting currently facilities to be more water efficient, but these resort hotels are also taking steps to maximize the water efficiency at their facilities. As Las Vegas continues to grow and expand, incorporating water efficient designs will be essential for sustaining its water supply.

e. Partnering with the Local Community

In addition to the multitude of water conservation measures resort hotels are taking individually, resort hotels are also working with the Southern Nevada Water Authority to reduce water use. In 2016, the Southern Nevada Water Authority installed thirteen hydrophones, which are acoustic devices that listen

¹⁷⁴ Press Release, MGM Resorts, *Restaurant Corridor at the Park Earns LEED Certification from the U.S. Green Building Council* (July 25, 2016) (on file with author).

¹⁷⁵ *Id.*

¹⁷⁶ Press Release, T-Mobile Arena, *T-Mobile Arena Becomes First Sports & Entertainment Stadium in Las Vegas to Achieve Prestigious LEED Green Building Certification* (Mar. 7, 2017) (on file with author).

¹⁷⁷ Press Release, T-Mobile Arena, *Celebrating the Grand Opening of T-Mobile Arena in Las Vegas!* (Apr. 6, 2016), <https://www.t-mobile.com/news/press/tmobile-arena-grand-opening>.

¹⁷⁸ Gina-Marie Cheeseman, *MGM Resorts International Practices Water Conservation in Las Vegas*, JUST MEANS BUS. BETTER BLOG (Sept. 28, 2017, 3:00 PM), <http://www.justmeans.com/blogs/mgm-resorts-international-practices-water-conservation-in-las-vegas>.

¹⁷⁹ *Id.*

¹⁸⁰ T-Mobile, *supra* note 176.

continuously for leaks along the Las Vegas Boulevard Water Main.¹⁸¹ Although acoustic leak detection devices are not new, the Southern Nevada Water Authority was the first public utility in the country to permanently install this technology on a water main.¹⁸² Over six billion gallons of water a day are wasted in the United States as a result of leaky pipes.¹⁸³ The technology allows engineers to pinpoint the exact location of a leak, which helps the Southern Nevada Water Authority to immediately go out and fix the problem.

Because of the success of this new technology in Las Vegas, and the buy-in from both public agencies and private industry, the city has become the epicenter for water innovation. For example, the University of Nevada's Desert Research Institute, the Southern Nevada Water Authority, and resort hotels have established the WaterStart program – a research center which finds and tests promising water saving technologies and helps them get to market.¹⁸⁴ As of early 2020 the program has provided nearly two million dollars to fund twenty-two pilot programs.¹⁸⁵ The program has also evaluated over 344 different water saving technologies.¹⁸⁶

Resort hotels are taking steps to work with the local community to minimize wasted water. Water is essential to everyone in the community. By creating local partnerships resort hotels are able to better protect the community's water supply.

Part IV: Conclusion

Resort hotels' water use accounts for only seven percent of the water supplied in Las Vegas.¹⁸⁷ The average guest at a resort hotel uses sixty-three gallons of water per day. In comparison, the amount of water used by a Las Vegas resident is nearly double that amount.¹⁸⁸ The amount of water Las Vegas will need is only expected to increase as it is estimated that the region's water demand will increase by eighty-five percent by 2065.¹⁸⁹ As the number of Las Vegas residents continue to grow, the city will continue to look for solutions to decrease its water use and consumption.

However, resort hotels are doing their part to reduce their water use and consumption. MGM Resorts International which operates twelve properties in

¹⁸¹ T.R. Goldman, *Las Vegas is Betting it Can Become the Silicon Valley of Water*, POLITICO (Apr. 21, 2016), <https://www.politico.com/magazine/story/2016/04/what-works-las-vegas-213836>.

¹⁸² *Id.*

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *Home Page with Statistics*, WATERSTART, <https://waterstart.com> (last visited Oct. 28, 2020).

¹⁸⁶ *Id.*

¹⁸⁷ ACCU Weather, *supra* note 161.

¹⁸⁸ *Saving Water in Nevada*, EPA (May 2016), <https://www.epa.gov/sites/production/files/2017-02/documents/ws-ourwater-nevada-state-fact-sheet.pdf>.

¹⁸⁹ *Id.*

Las Vegas, has a corporate goal of reducing their water use by thirty-five percent by 2030.¹⁹⁰ They are also striving to have 100 percent of their management employees trained on environmental policy and goals by the same time.¹⁹¹ The Las Vegas Sands Corporation achieved its 2020 goal of reducing its 2015 water consumption level by three percent per square foot, and is looking to set new goals.¹⁹² All of these measures help to reach the Southern Nevada Water District's goal of reducing per capita water use to 199 gallons by 2035.¹⁹³

The resort hotel industry has taken numerous water conservation steps to minimize their water use and consumption. However, resort hotels will continue to face challenges as the number of tourists visiting Las Vegas continues to grow.

Yet, the resort hotel industry is one of Nevada's best bets in terms of industry trying to become more water efficient. Resort hotels on the Las Vegas Strip use only seven percent of Las Vegas' water supply¹⁹⁴, but account for nearly seventy percent of the State's economy. Resort hotels have shown that sustainability is achievable.

¹⁹⁰ Press Release, MGM Resorts International, Environmental Policy (Jan. 24, 2018) (on file with author).

¹⁹¹ *Id.*

¹⁹² Wilson, *supra* note 129.

¹⁹³ WATER CONSERVATION PLAN 2014-2018, SOUTHERN NEVADA WATER AUTHORITY 5 (2014), <https://www.snwa.com/assets/pdf/reports-conservation-plan.pdf>.

¹⁹⁴ Person, *supra* note 115.