

**OPEN FILE REPORT OF-00-09**  
**Atlas of Sand, Gravel, & Quarry Aggregate Resources, Colorado Front Range**  
**Colorado Geological Survey**  
**Denver, Colorado, April 2000**

For those notes highlighted by an (\*), the exact locations were not determined from the original map or were not delineated on the original map. The note has been placed as near as possible to the position shown on the original maps, though the feature to which the note refers may extend over multiple quadrangles.

AR01\* - Valley fill along Middle St. Vrain Creek probably contains local deposits of sand and gravel. Quad: Allenspark, Raymond.

AR02 - Bedrock unit is exposed in most of the gullies in the upper slopes of Unit U4. Quads: Alta Vista, Ramah South.

AR03 - Wind deposited sand is common in the area north of Harrisville Road. Quad: Alta Vista, Ramah South.

AR04 - Overburden on this terrace appears to be wind deposited material 8 feet to as much as 25 feet in thickness, thinning toward the south. Southern boundary of terrace is highly variable. Quad: Avondale, Vineland.

AR05 - Probable conglomeratic sandstone. This bedrock unit would require blasting and crushing to make aggregate. Quads: Black Forest, Castle Rock North, Castle Rock South, Cherry Valley School, Dawson Butte, Eastonville, Greenland, Larkspur, Parker, Highlands Ranch, Peyton, Ponderosa Park, Russellville Gulch, Sedalia

AR06 - Generally a poor resource area though some aggregate produced locally. Overburden thickness increases toward the center of the landform. Recommend test drilling to determine favorable resource areas. Large areas should probably be excluded from mineral zoning. Overburden thickness in excess of 15 feet indicates non-economic areas unless overburden can be utilized. Quads: Buttes, Fountain SE, Pinon, Steele Hollow.

AR07 - Bedrock outcrops are common in Unit U3 between Big Sandy Creek and the higher upland surface (U3) in the extreme southwestern portion of the quadrangle. Quads: Calhan, Peyton.

AR08 - Sand dunes are common in unit U3. Quads: Calhan, Peyton, Ramah South, Haegler Ranch.

AR09 - The valley of Cherry Creek between Franktown and Parker, Colorado contains about 34 feet of sand and some gravel overlain by about 15 feet of overburden. The resource consists mainly of fine- to coarse-grained sand containing a small amount of fine-grained gravel. Thin layers of mainly fine-grained gravel occur interbedded with the fine-gravelly sand. The main tributary gulches that join Cherry Creek probably contain some resource in the lower portions of their valley fills. Quad: Castle Rock North, Ponderosa Park, Parker.

AR10 - The potential quarry aggregate shown on this map is fine- grained rhyolitic rock. This rock might be acceptable for aggregate but should be tested. Quads: Castle Rock North, Castle Rock South, Cherry Valley School, Dawson Butte, Larkspur, Greenland, Russellville Gulch, Sedalia.

AR11\* - Portions of Sellers, Lake, and Upper Lake Gulch may contain local deposits of fine-pebbly sand relatively free of organic matter. Quad: Castle Rock South.

AR12 - Deep red biotite-rich sandy clayey gravel suitable as road base. Quad: Cheyenne Mountain.

AR13 - Many large decomposed boulders in a sandy clay matrix suitable only as a road base material. Quads: Cheyenne Mountain, Mount Big Chief.

AR14 - Abundance of very large decomposed boulders. Quad: Cheyenne Mountain.

AR15 - Most of the gravels exposed in this area occur as dis- continuous heavily and cobbly lenses interbedded with layers of fine pebble, relatively clean, coarse-grained sand. Quads: Cobb Lake, Carr SW, Nunn.

AR16 - The value of the Box Elder Creek Valley deposits south of Wellington is questionable because of the thickness of overburden and, hence, the high overburden:resource ratio, as indicated by well logs. Quads: Cobb Lake, Wellington, Timnath, Fort Collins.

AR17\* - The floodplain of Greenhorn Creek west of Interstate 25 has a few small isolated, non-commercial deposits of sand and gravel that are not shown on this map. Quad: Colorado City.

AR18 - Coarse-grained upland sand deposits covered with thick deposits of fine-grained windblown material. Locally, sand and gravel pits have been developed for road metal. Most of this landform should probably be excluded from mineral zoning. Quads: Corral Bluffs, Fountain NE, Fountain SE, Hanover NW, Ellicott, Hanover, Falcon.

AR19 - Sand and gravel is discontinuous; however, this landform is important to the County and State as an aggregate resource. Quads: Deer Trail, Peoria.

AR21 - This extensive area (U4) consists of varied sands, gravels, and conglomerates (Ogallala Formation). The large isolated mesas (U2 and U4) within are of similar composition but may be of younger age. The value of the entire area as a resource is questionable, but the mesas are certainly commercial deposits. Quad: Chalk Bluffs East, Chalk Bluffs West, Carr East, Carr West.

AR22\* - Surfaces here have a veneer of gravel but the deposits are very thin and are not significant. Quad: Eastman Creek SE.

AR23\* - Gravels along this ridge are generally less than 2 feet thick and are probably not significant deposits. Quad: Eastman Creek South.

AR24 - More than 100 feet of coarse sands, pebbly, cobbly, and bouldery gravels

(Ogallala Formation). Cementation (calcium carbonate), soundness, and percent fines vary significantly from bed to bed. Cementation in the upper gravels is so thorough that it forms a resistant caprock of conglomerate. Quads: Carr East, Carr West.

AR25 - Possibly the ancient valley of Spottlewood Creek. May contain thick deposits of sand and gravel. More drilling required here and to the northwest. Quads: Carr West, Dover, Carr SW, Round Butte.

AR26 - Conglomerate (White River Group). Quad: Carr SW.

AR27 - Pebbly, cobbly, bouldery conglomerate (White River Group), 6 to 15 feet thick, well-cemented. Soundness of individual stones is quite variable. Value as a resource is questionable. Quad: Carr SW.

AR28 - In northern half of floodplain, sand and gravel deposits are highly variable in thickness, locally cemented, and locally high in amounts of weak rock. Quads: Carr SW, Buckeye.

AR29 - Coarse-grained upland sand deposit cemented with red clay. An excellent road metal. Usually less than 2 feet of soil is developed upon this sand unit. Because of its location and size, this unit probably does not require zoning protection except as might be required by the State or County highway departments to maintain aggregate pits. Quads: Rush, Yoder, Rush NW, Holcolm Hills, Holtwold Store; taken from El Paso County Highway Map, Calhan, Ramah South, Alta Vista.

AR30 - Coarse-grained upland sand deposits extensively covered by loess and sand dunes. Sand blowouts are common. Coarse sands are utilized locally for road metal. This resource area probably does not require zoning protection due to its size and the extent of overburden. Quads: Truckton SE, Edison School, Hanover NE, Rush, Yoder, Big Springs Ranch, Holcolm Hills, Rush NW, Holtwold Store; taken from El Paso County Highway Map.

AR31 - Sand dune field at least 40 feet thick. A non-resource area. Quads: Big Springs Ranch, Truckton, Hanover NE, Edison School, Hanover SE; taken from El Paso County Highway Map, North Avondale, Boone Hill, North Avondale NE, Highlands Church, Hanover NW, Truckton.

AR32 - Clean, coarse sands are not utilized locally but might be a source of asphalt mix for some local roads in the future. Resource zoning of the floodplains is probably not necessary considering their size and distribution. Quads: Big Springs Ranch, Hanover SE, Hanover NE, Holcolm Hills; taken from El Paso County Highway Map, Hanover NW, Hanover, Ellicott, Haegler Ranch, Bar J H Ranch, Calhan, Peyton.

AR33 - Gravel resources unlikely. Quads: Fountain, Elsmere, Corral Bluffs.

AR34 - Loess overburden thickens toward the center of this landform. Quad: Fountain.

AR35 - Gravel outcrops occur along edge of upland surface. Overburden (wind deposited sand, loess, and fine-grained alluvium) thickness increases rapidly away from edge. Usable resources will most likely be developed in a one-half mile strip along edge of

upland surface. Mostly a sand resource area. Quads: Fowler, Grandview School, Boone Hill.

AR36 - Coarse upland sands and gravels (probably old valley fill or fan deposits) underlie an extensive cover of blow sand (dunes) and finer grained reworked windblown material. Quads: Grandview School, Highlands Church.

AR37 - Most likely a part of the fine aggregate resource area east of Porter Creek. Both areas are now the dissected remnants of a possible large fan complex whose source was ancient Porter Creek in an area to the northwest of Wyoming. Quad: Hereford NW.

AR38 - Younger fan of Porter Creek origin. Value as a resource is questionable because of high stripping ratio. Quads: Hereford NW, Hereford.

AR39 - Potential quarry aggregate resource area of medium-grained pink biotite granitic rock. Quads: Mount Big Chief, Mount Pittsburg.

AR41\* - Small patches of aggregate occur along Williams and Dry Creeks and on the high upland deposits north of the Arkansas River and west of Dry Creek. These deposits, mapped as Qs by Scott (1964), tend to be low in coarse aggregate, most of which is limestone chips. Quad: Northwest Pueblo.

AR42\* - Upland surfaces in the vicinity of Cottonwood, Lone Tree, and Happy Canyon Creeks are mantled by surficial deposits of variable thickness that were derived from the underlying Dawson Arkose. These deposits consist mainly of quartz sand, a small amount of fine-grained gravel, and a significant amount of fines. Quad: Parker.

AR43 - The valley of Cherry Creek between Parker, Colorado and Cherry Creek Lake contains about 48 feet of sand and some gravel overlain by about 10 feet of overburden. The resource consists mainly of fine- to coarse-grained sand containing a small amount of fine-grained gravel. Thin layers of mainly fine-grained gravel occur interbedded with the fine-gravelly sand. The main tributary gulches that join Cherry Creek probably contain some resources in the lower portions of their valley fills. Quad: Parker.

AR44 - High quartz spherical hydrafrac quality sands. Quad: Pikeview.

AR45 - The principal surface landforms in this area are sand dunes created by wind action, however, the basic resource unit is a well-graded, poorly-sorted, water-deposited sand. This sand has a very high quartz content in the coarser fraction. The larger quartz grains are spherical and range in size from 1 mm to 3 mm. Quad: Pikeview.

AR46 - The lower portion of the valley fills along Sulphur and Piney Creeks may contain some aggregate resources. Quad: Piney Creek, Parker.

AR47\* - Bayou, Kinney, and Tallman Gulches probably contain sand and fine-grained gravel that is relatively free of fines and organic matter in the lower portions of their valley fills. Quad: Ponderosa Park.

AR48 - Gravels are dispersed across these landforms. Quad: Southwest Pueblo.

AR49\* - Valley fill in the vicinity of Brainard, Long, Silver, Stapp, and Rainbow Lakes probably contain local deposits of sand and gravel. Quad: Ward.

AR51 - The floodplain and valley fill deposits here are of questionable value because 1) the gravels upstream near the Larimer-Boulder County line are of poor quality, 2) exposures along the river show only very fine-grained alluvium and 3) the drill hole south of Johnstown (WG-36) showed no apparent aggregate resource. Much more drilling will be required to determine the extent of those gravels seen upstream. Quads: Berthoud, Johnstown, Milliken.

AR52 - Gravel deposits underlie this area but thickness of overburden and poor-quality sands and gravels will probably prohibit their extraction. Quads: Brighton, Commerce City, Eastlake, Montbello.

AR53 - Well logs show sand and gravel in this area, but the thickness of the overburden (as much as 30 feet) will very critically limit the area's value as a resource. Quads: Eaton, Greeley.

AR54\* - The material that mantles Table Mountain, Shanahan Hill and the Table Mesa area is very high in fines and consists primarily of sand- stone fragments; boulder-size clasts are common. These deposits are not potential sources of aggregate and could only be used locally for fill. Quad: Eldorado Springs.

AR55 - This deposit consists mainly of granitic and sandstone clasts. Quads: Eldorado Springs, Louisville.

AR56 - This deposit consists almost entirely of quartzite clasts. Quads: Eldorado Springs, Ralston Buttes, Louisville, Golden.

AR57 - Although only sand has been extracted along Cherry Creek, well logs indicate the presence of channel gravels at depth. Quads: Englewood, Fitzsimons, Fort Logan, Arvada, Commerce City.

AR58 - This alluvial fan, in form, does extend eastward to the river bluffs. However, the coarser deposits in the western portion grade eastward into very fine-grained deposits. The transitional boundary of the aggregate deposits was approximated on the basis of well data and topographic expression. Although gravel pits were noted in this fan, the deposit is not an important resource because 1) it contains considerable clay and weak and decomposed rocks, 2) much of the area has already been lost to suburbanization, and 3) the higher quality gravels along the Cache La Poudre River will amply meet the area's needs. Quads: Fort Collins, Horsetooth Reservoir.

AR59 - Portions of the valley fill may contain deposits of pebbly and cobbly sand. Quads: Frederick, Fort Lupton, Eastlake, Lafayette.

AR60 - Potential quarry aggregate resource areas. Very hard, tough, dense igneous rock (monzonite). Rock has been quarried and used for concrete aggregate, road metal, riprap, and building stone (Van Horn, 1957). Quad: Golden.

AR61 - Potential quarry aggregate resource area. Very hard, tough, dense igneous rock

(Table Mountain Shoshonite or basalt). Rock has been quarried and used for concrete aggregate, road metal, riprap, and building stone (Van Horn, 1957). Quads: Golden, Morrison.

AR62 - This valley fill, part of the ancient Lone Tree Creek system, has more potential as a resource than the terraces (T4) immediately to the northwest because of the notably thinner overburden and, hence, a lower overburden:resource ratio, as indicated by well logs. Quads: Greeley, Kersey, Eaton.

AR63 - Although this terrace is classed as a fine-aggregate resource, some well logs indicate that there may be significant gravels at depth. Quads: Greeley, LaSalle, Milliken, Kersey.

AR64 - The gravels in these alluvial fans are of poor quality, having a considerable percentage of clay, weak sedimentary rocks, and highly weathered, decomposed metamorphic and igneous rocks. Inasmuch as four gravel pits were noted in these fans, they are not important resources because 1) most of the area has already been lost to suburbanization and 2) the higher quality gravels along the Cache La Poudre River will amply meet the area's needs. Quad: Horsetooth Reservoir.

AR65 - Aggregate may be thin or absent and low in quality. Quads: Lyons, Niwot, Hygiene.

AR66\* - Portions of the Walnut Creek floodplain may contain deposits of sand and gravel. Quads: Lafayette, Louisville.

AR67 - The material that mantles Shanahan Hill and the Table Mesa area is very high in fines and contains a high percentage of sandstone fragments. These deposits are not potential sources of aggregate and could only be used locally for fill. Quad: Louisville.

AR68 - Portions of the Coal Creek floodplain contain small deposits of sand and gravel. Quad: Louisville.

AR69 - Some gravel layers may be present on this upland surface, but the overburden (increasing in thickness away from the river) limits their value as a resource. The most likely areas for extraction will be confined to a narrow strip north of the river where the overburden is thinnest. Quads: Loveland, Windsor.

AR70 - Green Mountain Conglomerate: pebbly to bouldery conglomerate with interbedded sandstones, siltstones, and claystones. Main rock types are granite, gneiss, schist, volcanics, quartzite, and sandstone. Thickness about 650 feet. Potential source of sand and gravel. Quad: Morrison.

AR71 - This deposit consists mainly of sandstone clasts. Quad: Ralston Buttes.

AR72 - Carbonates Quads: Dakan Mountain, Westcreek, Woodland Park, Mount Pittsburg, Mount Big Chief, Cheyenne Mountain.

AR73 - Quartzite and Carbonates Quad: Larkspur.

AR74 - Limestone Quads: Manitou Springs, Cascade.

AR75 - Quartzite Quads: Eldorado Springs, Ralston Buttes.

AR76 - Fine-grained intermediate igneous rock Quads: Boulder, Lyons.

AR77 - Fine-grained mafic igneous rock Quad: Niwot.

LN01 - Transitional boundary between fine-grained aggregate resource to the east and non-resource to the west. Quads: Black Forest, Eastonville, Falcon NW, Falcon.

LN02 - Arbitrary boundary between F4 and F1. Possibility for some buried gravels in F3. Quad: Kersey.

LN03 - Approximate boundary of buried valley. Contact obscured by overburden and/or wind-deposited sand. Quads: Klug Ranch, Hudson, Valley View School, LaSalle, Mile High Lakes, Milton Reservoir, Brighton, Hardin.

LN04 - Arbitrary boundary. Quads: Strasburg, Strasburg SE.

LN05 - Approximate boundary of potential quarry aggregate; fine-grained intermediate igneous rock. Quads: Boulder, Lyons.

LN06 - Boundary between F1 and F4 drawn just downstream from last gravel pits observed in floodplain deposits. Lack of gravel further downstream may reflect decreasing size and percentage of floodplain gravels. Quad: Brighton.

LN07 - Approximate boundaries of ancient Cherry Creek tributary valley (based on well-log interpretation). Valley fill contains about 23 feet of sand and gravel buried by more than 25 feet of windblown sand. Quads: Commerce City, Montbello.

LN08 - Approximate boundaries of ancient Cherry Creek valley (based on well-log interpretation). Quad: Commerce City.

LN09 - Approximate boundaries of ancient Cherry Creek tributary valley (base on well-log interpretation). Valley fill contains 20 to 100 feet of sand and gravel buried by as much as 35 feet of windblown sand. Quads: Commerce City, Montbello.

LN10 - Approximate boundaries of ancient Cherry Creek valley (based on well-log interpretation). Valley fill contains 15 to 80 feet of sand and gravel with as much as 40 feet of interbedded clay, all buried by 10 to 30 feet of windblown silt and sand. Quads: Commerce City, Englewood.

LN11 - Approximate western boundary of ancient Sand Creek tributary (based on well-log interpretation). Valley fill contains 8 to 23 feet of sand and gravel buried by 8 to 30 feet of windblown silt and sand. Quads: Commerce City, Fitzsimons, Montbello.

LN12 - Approximate boundary of potential quarry aggregate; quartzite. Quads: Eldorado Springs, Ralston Buttes.

LN13 - The F1-F4 and T1-T3 contacts are arbitrary boundaries drawn to contrast the coarser, cleaner sediment of the Cache La Poudre River to the finer grained sediment of the South Platte River. Inasmuch as these two dissimilar rivers have together produced one landform (terrace or floodplain), observations in the terrace gravel pits show that there are important, distinct differences in their sediment contributions. Much more data will be needed to more closely approximate these boundaries. Quad: Greeley.

LN14 - Approximate boundary of potential quarry aggregate; fine-grained, mafic igneous rock. Quad: Niwot.

LN15 - Approximate outcrop area of carbonate potential quarry aggregate resource. Quads: Mount Big Chief, Mount Pittsburg, Cheyenne Mountain.

LN16 - Approximate outcrop area of carbonate potential quarry aggregate resource. Outcrop area was not field-checked for accuracy of location. Quad: Woodland Park.

PT01 - Mined-out gravel pits south of Clear Creek used for sanitary landfills and reclaimed for commercial use. Quad: Arvada.

PT02 - Gravel pits operated by the Colorado Department of Highways. Quad: Bracewell.

PT03 - Mined-out gravel pits used for sanitary landfills and reclaimed for industrial and railyard sites. Quad: Commerce City.

PT04 - Mobil Mix Co. pit. Material was once used for concrete aggregate but now is used for road base. Quad: Eaton.

PT05 - Mined-out gravel pits used for sanitary landfills and reclaimed for industrial and recreation uses. Quad: Englewood.

PT06 - Mined-out gravel pits currently undergoing sanitary landfilling. Quad: Fort Logan.

PT07 - Grus pit operated by Larimer County Highway Department; coarse-grained altered granitic debris used for road topping. Quad: Livermore.

PT08 - Colorado Lien Co. crushed rock quarry Quad: Livermore.

PT09 - Sandstone quarry owned by Larimer County and operated by North Poudre River Irrigation Co. for riprap along irrigation ditches. Quad: Livermore.

PT10 - Schmidt construction quarry produces concrete aggregate. Quad: Mount Pittsburg.

PT11 - Pit in Dawson Arkose Quads: Parker, Piney Creek, Castle Rock North, Highlands Ranch.

PT12 - Igneous, sedimentary, and metamorphic cobbles up to 6 inches. Quad: Deer Trail.